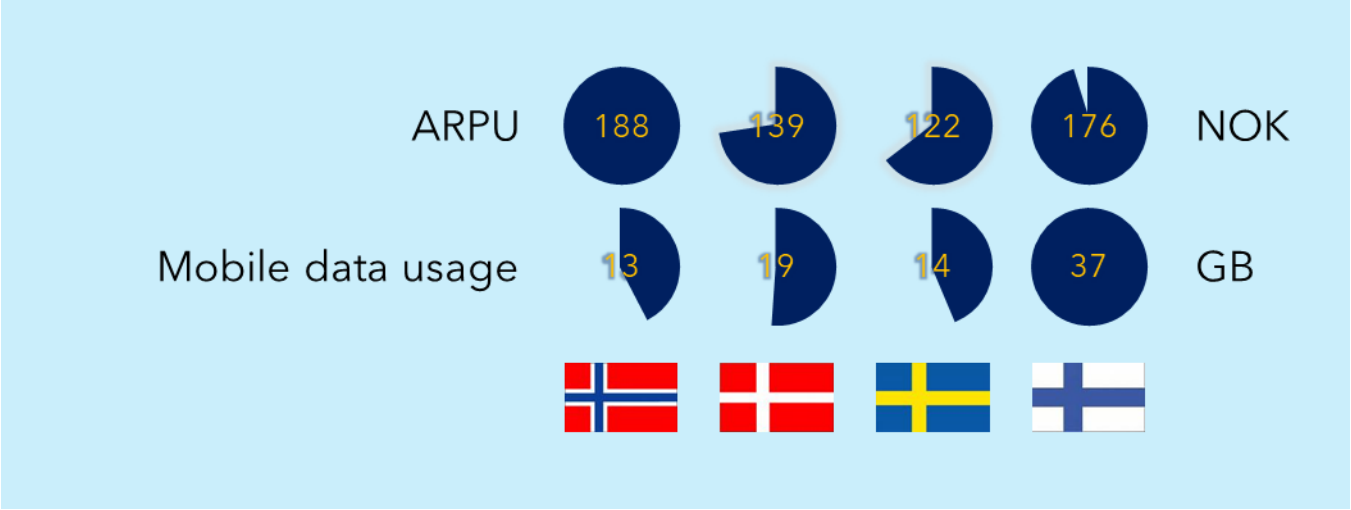
tefficient

Analysis prepared for Digitaliserings- og forvaltningsdepartementet

Assessment of Norwegian mobile revenues in a Nordic context 2024



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1 Executive summary

This report, commissioned by Digitaliserings- og forvaltningsdepartementet (DFD), is the fourth, expanded, and updated edition. It focuses on data up to December 2023, building upon previous analyses that covered data up to June 2020, June 2021, and December 2022.

The analysis employs a variety of metrics, consistently comparing data across four Nordic markets: Norway, Denmark, Sweden, and Finland. These markets are shown to form a nearly perfect peer group.

Regulator data indicates that the average revenue per mobile subscription (ARPU) in Norway—both before and after purchasing power parity adjustment—is higher than in the other three countries. This comparison holds true whether machine-to-machine/IoT (M2M) and fixed wireless access (FWA) are included or excluded.

Norway has the lowest mobile data usage among the Nordic countries in all comparisons except one (vs. Sweden, excluding M2M and including FWA). Overall, Norway still presents an unfavourable scenario for consumers, with the highest revenue yet the lowest usage per subscription.

To illustrate current mobile data phone plan pricing, the analysis compares 162 plans offering unlimited voice and messaging with varying data allotments. This section has been expanded compared to previous editions. The data shows that Norwegian plans are not yet fully competitive on price with those in Denmark, Sweden, and Finland. For plans marketed as unlimited, Norway's policy of throttling speeds after 100 GB of data usage per month is more restrictive than in the other three countries. Excluding this policy, the price gap between Norway and Finland/Sweden is relatively small—about 30-50 NOK per month. Danish providers offer the most affordable plans in the Nordics.

In 2022 and 2023, Telenor Norway and Telia Norway had the highest EBITDA margins in the Nordics, indicating that high operational expenditures are not the cause of higher Norwegian integrated (fixed and mobile) revenue. Lyse Tele had a lower EBITDA margin, closer to the Nordic median when excluding Telenor Norway and Telia Norway.

Norwegian operators invest a larger portion of their integrated revenue in capital expenditures (CAPEX) compared to the median Nordic operator. In 2023, this was particularly true for Lyse Tele, whereas Telenor Norway and Telia Norway's CAPEX to revenue ratios decreased. Despite this, Telia Norway and Telenor Norway's integrated EBITDA-CAPEX (approximately cash flow) margins remain the highest in the Nordics, allowing them to comfortably sustain their current CAPEX levels. Lyse Tele, however, could not cover its CAPEX with its EBITDA in 2023.

Denmark has closed the gap on Norway in terms of data download speed, though Norwegian networks still provide a faster experience than those in Finland and Sweden. Low mobile data usage and high CAPEX to revenue ratios contribute to Norway's superior speeds. However, focusing on overall consistent quality, operators from all four countries—Norway, Denmark, Sweden, and Finland—rank globally at the top. In 5G speed and availability, Denmark and Finland lead over Norway, while Sweden lags behind.

The analysis confirms that the Norwegian mobile market remains uniquely concentrated, although the concentration index (HHI) further decreased in 2023.

This edition does not repeat the full root cause analysis of the original report but reaffirms the key finding: Regardless of purchasing power adjustments, Norwegian mobile revenue per GB is higher than in Denmark, Sweden, and Finland. The most likely root cause is the higher market concentration in Norway.

2 Background

This report, commissioned by Digitaliserings- og forvaltningsdepartementet (DFD), is the fourth, expanded, and updated edition. Previous versions were dated 22 December 2020[1], 31 January 2022[2] and 26 September 2023[3]. The historical analyses are focused on data up to June 2020, June 2021, and December 2022 respectively – whereas this analysis is focused on data up to December 2023.

[1] Can be downloaded from https://www.regjeringen.no/no/dokumentarkiv/regjeringen-solberg/aktuelt-regjeringen-solberg/kmd/nyheterKMD/2021/ny-rapport-viser-at-konkurransen-i-mobilmarkedene-ma-bli-bedre/id2843838/

[2] Can be downloaded from https://www.regjeringen.no/no/aktuelt/norske-mobilpriser-er-fortsatt-hoye-i-nordisk-sammenheng/id2909632/

[3] Can be downloaded from https://www.regjeringen.no/no/aktuelt/redusert-pris-for-store-datapakkar-men-norske-mobilkundar-betalar-framleis-mest-i-norden/id2991351/ The September version is an update of the initial version, dated 26 June 2023, and replaced the previous model for purchasing power parity adjustment.

3 Peer group

Just like in the previous editions, the peer group consists of the four Nordic countries **Norway, Denmark, Sweden, and Finland**. These four countries form a near-perfect international peer group. All metrics will always[4] be compared between these four countries to allow the reader to understand how one metric may affect another metric.

Below are some high-level indicators to show why Norway, Denmark, Sweden, and Finland – at an integrated (mobile and fixed) level – most often are comparable.

	Norway	Denmark	Sweden	Finland
Mobile				
High smartphone penetration	>90%	>90%	>90%	>90%
High data-only (mbb) penetration incl. FWA excl. M2M	7%	14%	10%	23%
High mobile data traffic [GB per SIM incl. M2M per month]	7.0 excl. FWA 13.0 incl. FWA	18.8 incl. FWA	10.1 excl. FWA 14.3 incl. FWA	36.5 excl. FWA
High contract share of mobile subscriber base excl. M2M	93%	98%	84%	92%
Low/medium mobile churn excl. M2M [per year]	15-25%	15-30%	15-25%	15-20%
Subsidy/instalment model in mobile equipment sales	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
World-class mobile network quality	Yes	Yes	Yes	Yes
High 5G population coverage	94% Telia 81% Telenor Ice n/a	TDC NET 99% Telenor/Telia 93% '3' 90%	Telia 82% Tele2/Telenor 60% '3' 40% Q1 2024	DNA 94% Elisa 92% Telia 90%
Active mobile network sharing	No	Yes	Yes	Yes
Fixed excl. FWA				
High fibre share of fixed broadband base excl. FWA	79%	55%	83%	68%
Medium cable modem share of fixed broadband base	19%	32%	16%	28%
High median download speed [Mbit/s]	142 #37 in the world	230 #9 in the world	157 #28 in the world	122 #41 in the world
Fixed-mobile convergent offers	Yes	Yes	Yes	Yes

Figure 1. Comparison of some high-level business drivers in Norway, Denmark, Sweden, and Finland[5] [source: Tefficient, regulators, operators, Ookla]

This analysis is principally based on three separate sources:

1. **Telecom regulators**: This analysis relies partly on **reported market data from the four Nordic regulators** Nkom, SDFI, PTS, and Traficom to derive metrics on average revenue per user (ARPU), average mobile data usage, and total mobile service revenue per consumed gigabyte (GB). The

[4] On a few occasions, regulatory data with sufficient break-down isn't available, leaving out that metric for the country in question.
[5] Subscriber and coverage figures are for December 2023 unless stated differently, usage figures for the whole year of 2023.

benefit of using regulatory data is that it captures what mobile subscribers actually pay – so-called back book pricing – not the prices of the currently best offers on the market.

2. **Telecom operators**: ARPU is typically also reported by the telecom operators and this analysis also adds that. In addition, telecom operators report their financial performance, and this analysis looks at profitability and investment metrics such as earnings before interest, taxation, depreciation and amortisation (EBITDA) and capital expenditure (CAPEX) to revenue ratios. The following operators are included:

    - Norway: Telenor, Telia, Lyse Tele
    - Denmark: Nuuday/TDC NET, Telenor, Telia, 3
    - Sweden: Telia, Tele2, Telenor, 3
    - Finland: Elisa, Telia, DNA

3. **Current consumer prices, available online**: Although we, for the reason stated, prefer to analyse the back book pricing through regulatory data, this analysis still partly relies on Tefficient's research of the currently best offers available to consumers online – so called front book pricing. This part has been enlarged in comparison to the previous editions of this analysis. The following providers are included:

    - Norway: Telenor, Telia, Ice, Talkmore, OneCall, NiceMobil, Fjordkraft, Chilimobil, Happybytes
    - Denmark: YouSee, Telenor, Telia, 3, Telmore, CBB, Call me, Oister, Flexii
    - Sweden: Telia, Tele2, Telenor, 3, Halebop, Comviq, Vimla, Hallon, Chilimobil
    - Finland: Elisa, Telia, DNA, Telia Dot, Moi

4 Observed data issues

4.1 Inability to exclude M2M traffic and revenues for Denmark and Finland

In the original analysis from 2020, we had an issue with the large number of international machine-to-machine or IoT subscriptions[6] (mainly from Telenor Connexion) being homebased in Sweden. In newer versions, there's sufficient historical data on Sweden-only M2M subscriptions to exclude the previous "Sweden with also international M2M" category from our graphs, making them less complex and more comparable.

Although a step forward, we would ideally like to exclude M2M entirely from our analysis as it represents a very different segment of the mobile market than the human-focussed business. In the regulator reporting of Denmark and Finland, M2M revenues[7] and M2M traffic[8] are however not broken out from the total mobile service revenues and total mobile traffic and can't therefore be excluded.

The table below shows the M2M reporting situation.

M2M reporting	Norway	Denmark	Sweden	Finland
Subscriptions	✓	✓	✓	✓
Revenue	✓		✓	
Data traffic	✓		✓	

Figure 2. Comparison of the reporting of M2M by the Nordic regulators [source: Tefficient]

4.2 FWA traffic not included in the mobile data traffic for Norway and Finland

The four Nordic regulators deal with its reporting of mobile-based fixed wireless access, FWA, differently. Norway's Nkom and Finland's Traficom treat FWA as a fixed broadband service[9] whereas Sweden's PTS and Denmark's SDFI treat it as a mobile broadband service.

The table below shows the FWA reporting situation.

[6] Called M2M in this analysis.
[7] M2M SIM numbers are broken out, though. M2M represented 3.2% of Norwegian mobile revenues and 2.1% of Swedish mobile revenues in 2023 if excluding international M2M revenues. The Swedish figure was 6.1% if including international M2M revenues.
[8] M2M represented 1.1% of Norwegian mobile data traffic excl. FWA and 0.4% of Swedish mobile data traffic incl. FWA in 2023.
[9] In previous editions of this report, it was incorrectly assumed that the FWA traffic was included in the reported mobile data traffic of Finland. It is instead included in the reported fixed data traffic, but not broken out. With Finland's strict definition of FWA, resulting in a maximum of 54k FWA subscriptions by end of 2023, it's not seen to have a major impact as the mobile data traffic is so high in Finland.

FWA reporting	Norway	Denmark	Sweden	Finland
Subscriptions	✓		✓	(✓)**
Revenue	✓			
Data traffic	(✓)*		✓	

Figure 3. Comparison of the reporting of FWA by the Nordic regulators [source: Tefficient] *) An estimation based on Telenor's reported FWA data traffic can be made **) FWA is the substantial part of the reported "other technologies" broadband base

On top of the difference in what is reported on FWA, there's not full harmonisation in the definition of FWA between the three reporting Nordics regulators.

- Norway's Nkom and Finland's Traficom define FWA as a fixed installation sold to a specific address, but not necessarily with an outdoor antenna (only in practice). There should also be a certain resource reservation in place, e.g. a dedicated frequency band, a share of the capacity on a base station or network slicing, so that the FWA provider can guarantee an adequate level of service for an individual FWA subscription. A minimum speed should be communicated, not just a maximum speed.
- In its data questionnaire for providers, Sweden's PTS defines two types of FWA where the more advanced is defined similarly as in Norway and Finland – but the more relaxed definition is that it is just sold to a specific address with a minimum speed. Since the currently reported Swedish FWA numbers are so large, the FWA data reporting of PTS – subscriptions and traffic – is believed to rely on the latter, relaxed, definition.

In the previous editions of this analysis, we could not include the FWA traffic into the Norwegian mobile data traffic, thereby making it comparable to Denmark and Sweden, since it wasn't available. This was criticised by Telenor[10]. Although the full Norwegian FWA traffic for 2023 still isn't available, Nkom has access to the 2023 figure from the largest FWA provider, Telenor. Tefficient has used this – and the Nkom reported FWA subscription bases – to calculate the average data usage per Telenor FWA subscription to 343 GB per month in 2023. An assumption has been made that the FWA usage is the same for the other Norwegian providers, resulting in a total FWA data traffic figure for Norway.

The visualisation below summarises the M2M and FWA reporting of the different countries and shows which of the three metrics – ARPU, data usage and revenue per GB – that are available or can be calculated based on an acceptable assumption. There will be apple-to-apple comparison available for Norway on most metrics, but regretfully never against all three peer group countries at the same time.

[10] https://www.digi.no/artikler/telenor-frykter-feilvurderinger-fordi-kdds-mobilrapport-mangler-norske-ftb-tall/537467 (behind paywall).

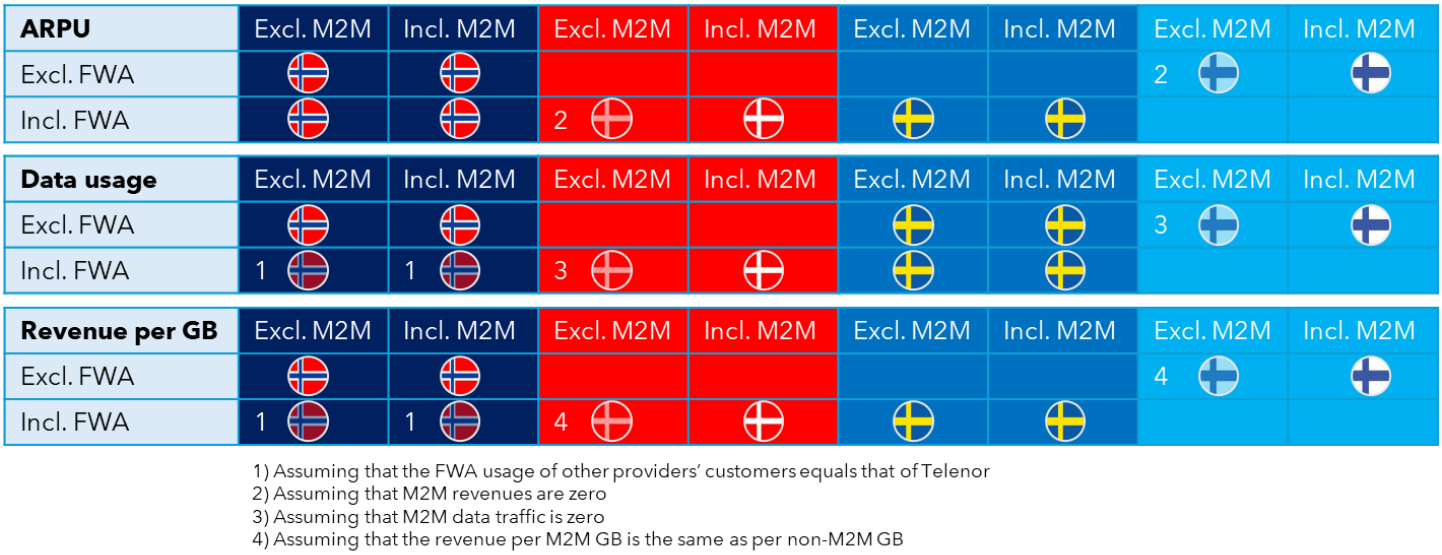

Figure 4. Visualisation of which of the three metrics – ARPU, data usage and revenue per GB – that are available for which country excluding and including M2M and excluding and including FWA [source: Tefficient]

4.3 Regulatory revenue data for Denmark and Finland not yet available for 2023

Finland's telecom regulator, Traficom, and Denmark's telecom regulator, SDFI, have not yet issued revenue statistics for 2023. Since all operators in Finland and Denmark publicly report mobile service revenues, there is a work-around by summing up these and add a reasonable share for MVNOs and others. Comparison with previous years – for which both datasets are available – show that numbers tend to match well.

4.4 Currency fluctuations

If the four countries had the same currency, this would not be an issue. Since the Danish krone (DKK) is pegged to the Euro (+-2.25%), two currencies, EUR, as used in Finland, and DKK are however closely linked. This means that the comparisons we make between Danish and Finnish ARPU levels in the following two sections aren't much affected by currency fluctuations.

The Norwegian krone (NOK) has been volatile and has weakened vs. the Euro during 2023, see Figure 5.

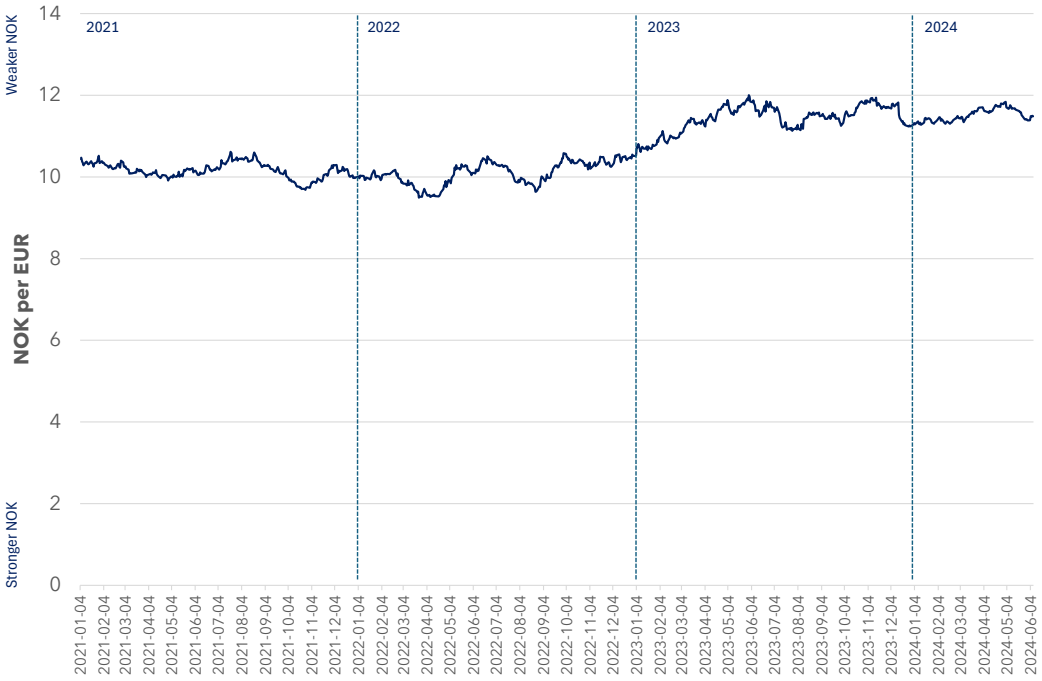

Figure 5. Development of the daily exchange rate between NOK and EUR from 2021 to date [source: ECB]

The Swedish krona (SEK) has followed the NOK around a 1:1 rate, see Figure 6. This means that also the SEK has weakened vs. the EUR during 2023.

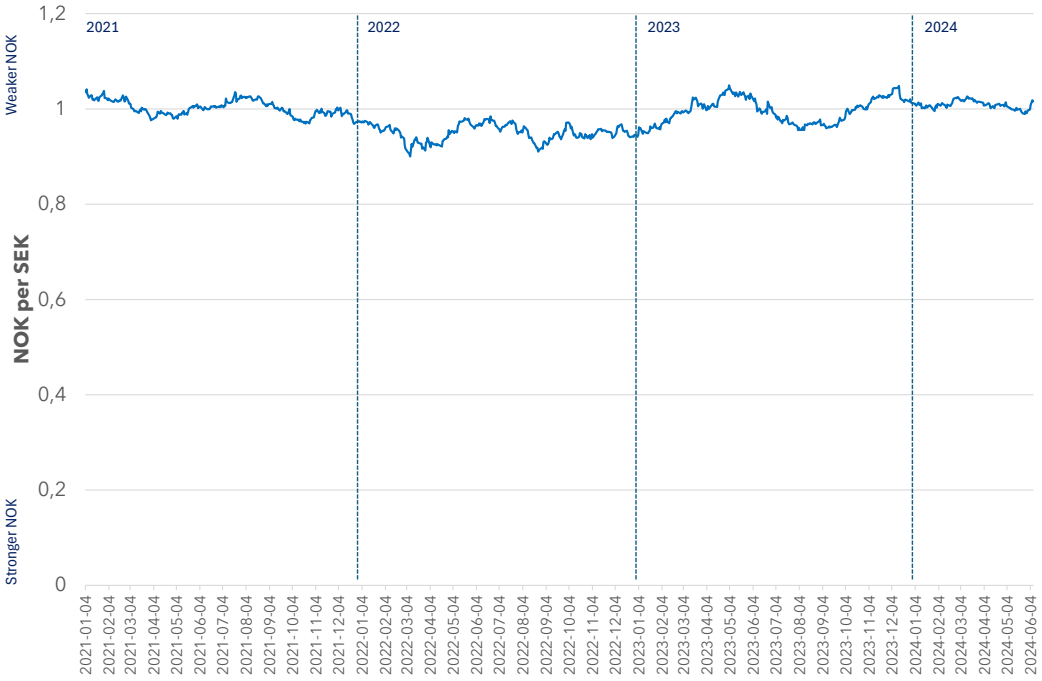

Figure 6. Development of the daily exchange rate between NOK and SEK from 2021 to date [source: ECB]

When we soon compare average revenue per user (ARPU) in Norwegian kroner we should hence have in mind that the relative weakness of the NOK and the SEK vs. EUR (and thereby DKK) will make Danish and Finnish ARPUs look higher when compared to Norwegian and Swedish ARPUs. The same goes for prices compared in section 8.

4.5 PPP fluctuations

Although many telecom parameters, as shown in Figure 1, are similar across our four countries, the purchasing power differs. It hence makes sense to try to adjust for it to end up with **purchasing power parity** (PPP).

In this analysis, most revenue and pricing diagrams are therefore produced in two versions:

- A comparison in NOK *without* adjustment for purchasing power
- A comparison in NOK *with* adjustment for purchasing power

An introduction to PPP is given in the box below[11].

Measuring economic activity in a country is difficult, since 'the economy' is a complex system with lots of moving parts. A common way to deal with this is to focus on aggregate indicators, such as total national output: "the monetary value of all goods and services produced within a country (or region) in a specific time period". That's what economists call the Gross Domestic Product (GDP).

GDP is measured using prevailing national prices to estimate the value of output. In other words, GDP is calculated using local currency units. This means that in order to make meaningful cross-country comparisons, it is necessary to translate figures into a common currency – i.e. use a consistent 'unit of measure'.

One option is to simply translate all national figures into one common currency (for instance, US dollars) using exchange rates from currency markets. But because market exchange rates do not always reflect the different price levels between countries, economists often opt for a different alternative. They create a hypothetical currency, called 'international dollars', and use this as a common unit of measure. **The idea is that a given amount of international dollars should buy roughly the same amount – and quality – of goods and services in any country**.

The exchange rates used to translate monetary values in local currencies into 'international dollars' (int-$) are the 'purchasing power parity conversion rates' (also called PPP conversion factors).

In this analysis, we turn to OECD/Eurostat for their PPPs. The input (and for 2023 also output) parameters for the PPP adjustment are shown in Figure 7 below.

[11] From Our World in Data: https://ourworldindata.org/what-are-ppps

	Input: Purchasing power parity (PPP) Total, National currency units per US dollar 2021 - estimate	Input: Purchasing power parity (PPP) Total, National currency units per US dollar 2022 - estimate	Input: Purchasing power parity (PPP) Total, National currency units per US dollar 2023 – "flash" estimate	Output: Exchange rate adjusted to Norwegian purchasing power level [national currency to PPP NOK] 2023
Norway	8,962043	8,418371	8,894996	1
Denmark	6,232205	6,153561	6,106244	0,95001908
Sweden	8,311676	8,363085	8,509281	1,050262214
Finland	0,782813	0,769643	0,764142	1,018876673

Figure 7. Comparison of purchasing parity (in international USD) in Norway, Denmark, Sweden, and Finland 2021, 2022 and 2023 and the PPP adjusted exchange rates used for 2023 [source: OECD[12]]

Since purchasing power parity (PPP) is calculated on a generic basket of goods and services – not specifically for mobile services – it should be regarded as indicative. Different institutes, e.g. OECD, IMF, and the World Bank report different PPP conversion rates. The rates are revisited and adjusted meaning that historical values might be changed. In OECD's case, at the time of writing, PPPs have been fixed up to 2020 whereas 2021 and 2022 still are estimates to be revised in 2025. The 2023 PPPs are so-called "flash" estimates – where normal estimates for 2023 only will be reported in 2025. There was a major adjustment done to the Norwegian 2023 "flash" value in June 2024.

For this reason, we do not fully trust the 2023 "flash" estimate for Norwegian PPP and encourages the reader to rather study the graphs without adjustment for purchasing power.

[12] Derived from https://data-explorer.oecd.org/vis?lc=en&fs[0]=Topic%2C1%7CEconomy%23ECO%23%7CNational%20accounts%23ECO_NAD%23&fs[1]=Topic%2C2%7CEconomy%23ECO%23%7CNational%20accounts%23ECO_NAD%23%7CGDP%20and%20non-financial%20accounts%23ECO_NAD_GNF%23&pg=0&fc=Topic&snb=53&df[ds]=dsDisseminateFinalDMZ&df[id]=DSD_NAMAIN10%40DF_TABLE4&df[ag]=OECD.SDD.NAD&df[vs]=&pd=%2C&dq=A.AUS%2BAUT%2BBEL%2BCAN%2BCHL%2BCOL%2BCRI%2BCZE%2BDNK%2BEST%2BFIN%2BFRA%2BDEU%2BGRC%2BHUN%2BISL%2BIRL%2BISR%2BITA%2BJPN%2BKOR%2BLVA%2BLTU%2BLUX%2BMEX%2BNLD%2BNZL%2BNOR%2BPOL%2BPRT%2BSVK%2BSVN%2BESP%2BSWE%2BCHE%2BTUR%2BGBR%2BUSA...PPP_B1GQ.....&to[TIME_PERIOD]=false&vw=tb 4 July 2024

5 Mobile ARPU per country

We have used regulator data from the four national regulatory agencies Nkom, SDFI, PTS and Traficom to calculate the average service revenue per mobile subscription[13] per month – normally referred to as **ARPU** within the industry. Figure 8 below shows the ARPU in NOK[14] including all mobile subscriptions *but* FWA, i.e. regular, data-only (mbb) and M2M/IoT subscriptions. For two countries, Norway and Finland, an apple-to-apple comparison is possible. Denmark and Sweden are just indicated in the graph since FWA can't be excluded there. Before each (set of) graphs, we visualise this with the relevant part of Figure 4:

ARPU	Excl. M2M	Incl. M2M	Excl. M2M	Incl. M2M	Excl. M2M	Incl. M2M	Excl. M2M	Incl. M2M
Excl. FWA								

To help navigation – there will be many graphs – a small matrix is shown in the graphs, visualising which of the four possible combinations of excluding/including M2M vs. excluding/including FWA that is analysed.

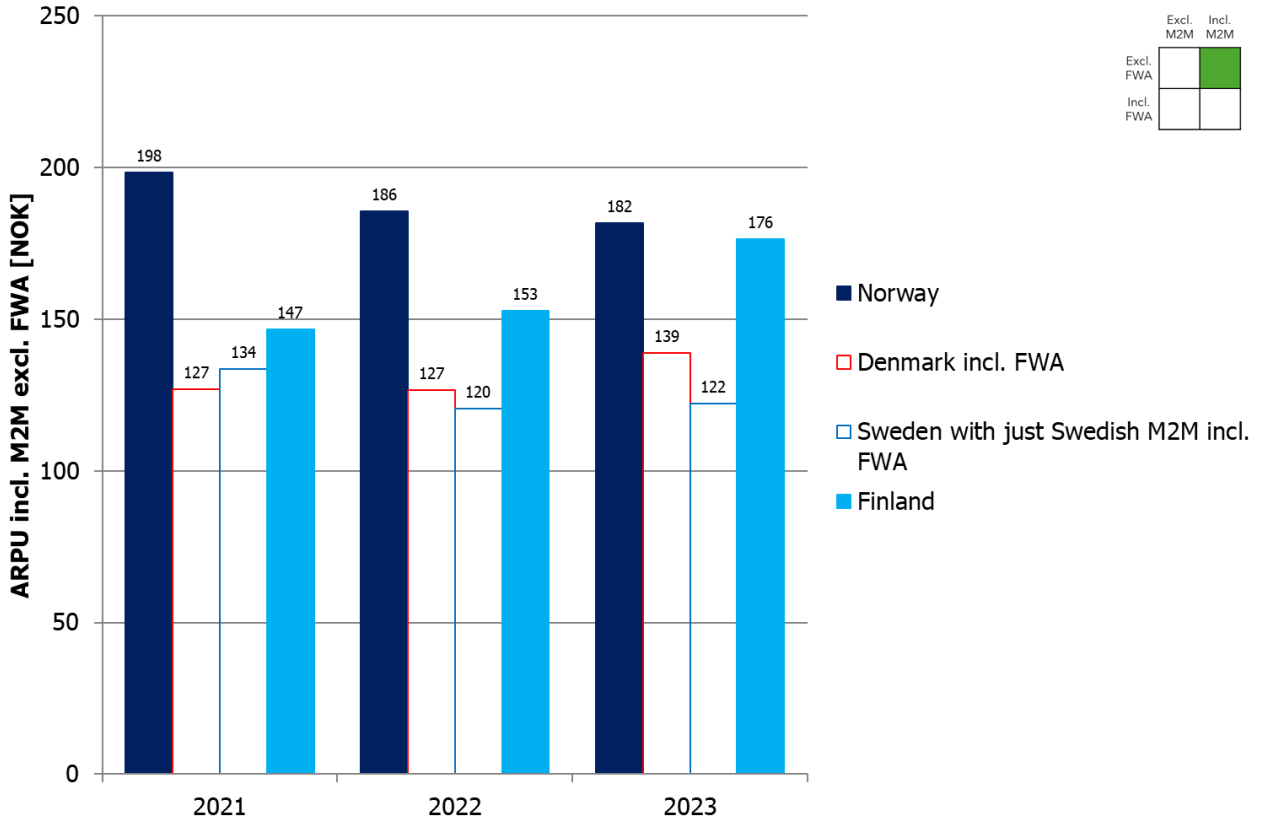

Figure 8. Comparison of mobile ARPU incl. M2M excl. FWA in Norway, Denmark, Sweden, and Finland 2021, 2022 and 2023. Denmark and Sweden are just indicated due to insufficient input data [source: Nkom, SDFI, PTS, Traficom, operator reports for 2023 for Finland and Denmark as regulators have not yet reported revenue].

[13] Average number of subscriptions in the period calculated as the average of the number of subscriptions at the start of the period and the number of subscriptions at the end of the period.

[14] Using the average of the daily exchange rate from ECB. For 2023: 0,65217 DKK per NOK, 1,00472 SEK per NOK, 0,087529 EUR per NOK.

Norway's mobile ARPU was **182 NOK** in 2023, less than in 2022 (186 NOK) and in 2021 (198 NOK). In NOK terms, Finland still had a bit lower ARPU than Norway in 2023 but, unlike Norway, with an increasing trend. The weakening of the NOK vs. the EUR in 2023 makes the ARPU growth in Finland look stronger.

To compensate for the differences in overall purchasing power, the ARPUs of Denmark, Sweden and Finland have been recalculated into purchasing power parity NOK (PPP NOK), see Figure 9.

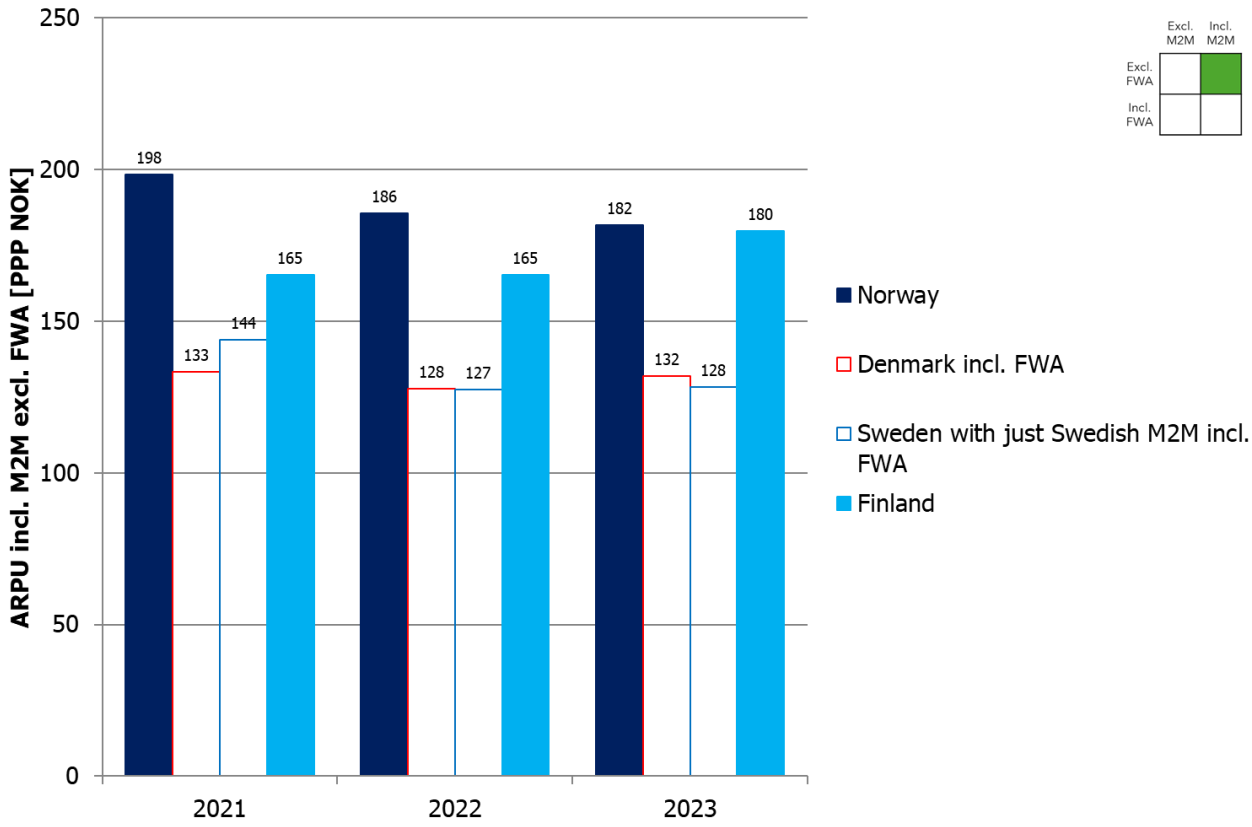

Figure 9. Comparison of PPP mobile ARPU incl. M2M excl. FWA in Norway, Denmark, Sweden, and Finland 2021, 2022 and 2023. Denmark and Sweden are just indicated due to insufficient input data [source: Nkom, SDFI, PTS, Traficom, OECD, operator reports for 2023 for Finland and Denmark as regulators have not yet reported revenue].

The PPP adjustment does not affect Norway, but changes the positions of Denmark, Sweden, and Finland. Also in PPP terms, Norway had a bit higher mobile ARPU than Finland.

The Norwegian revenue per mobile subscription including M2M but excluding FWA is, both before and after compensation for differences in purchasing power, a bit higher than in Finland.

Let's now include FWA revenues and subscribers and see how that changes the ARPU levels. This allows for an apple-to-apple comparison between Norway, Denmark, and Sweden but leaves out Finland as FWA revenues aren't reported (nor included in mobile revenues) there.

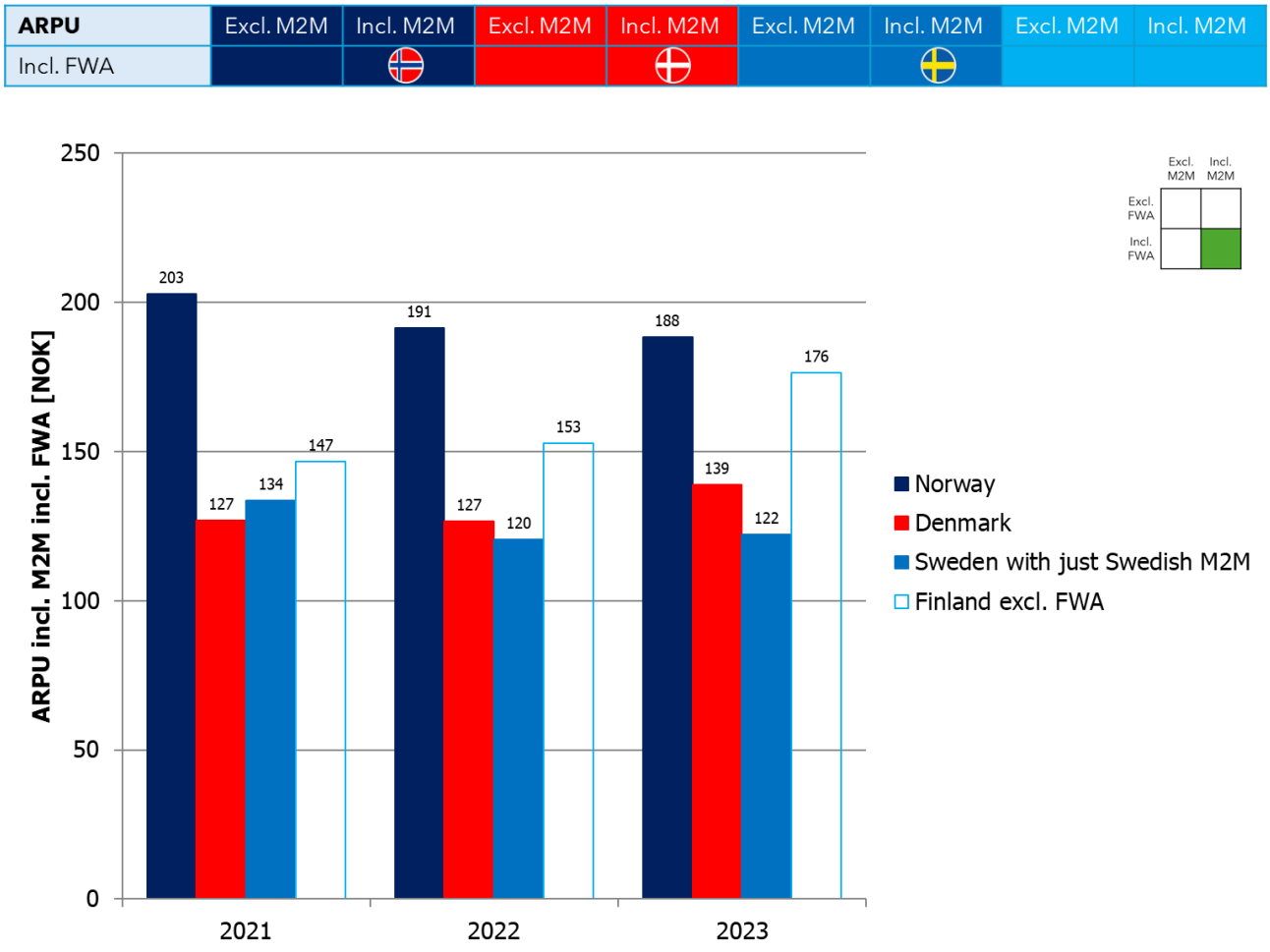

Figure 10. Comparison of mobile ARPU incl. M2M incl. FWA in Norway, Denmark, Sweden, and Finland 2021, 2022 and 2023. Finland is just indicated due to insufficient input data [source: Nkom, SDFI, PTS, Traficom, operator reports for 2023 for Finland and Denmark as regulators have not yet reported revenue].

Norway's mobile ARPU incl. FWA was **188 NOK** in 2023, less than in 2022 (191 NOK) and in 2021 (208 NOK). In NOK terms, Denmark and Sweden had much lower ARPU than Norway in 2023 but, unlike Norway, with a flat (Sweden) or increasing (Finland) trend. The weakening of the NOK vs. the DKK in 2023 makes the ARPU growth in Denmark look stronger.

The next graph is recalculated into purchasing power parity NOK (PPP NOK).

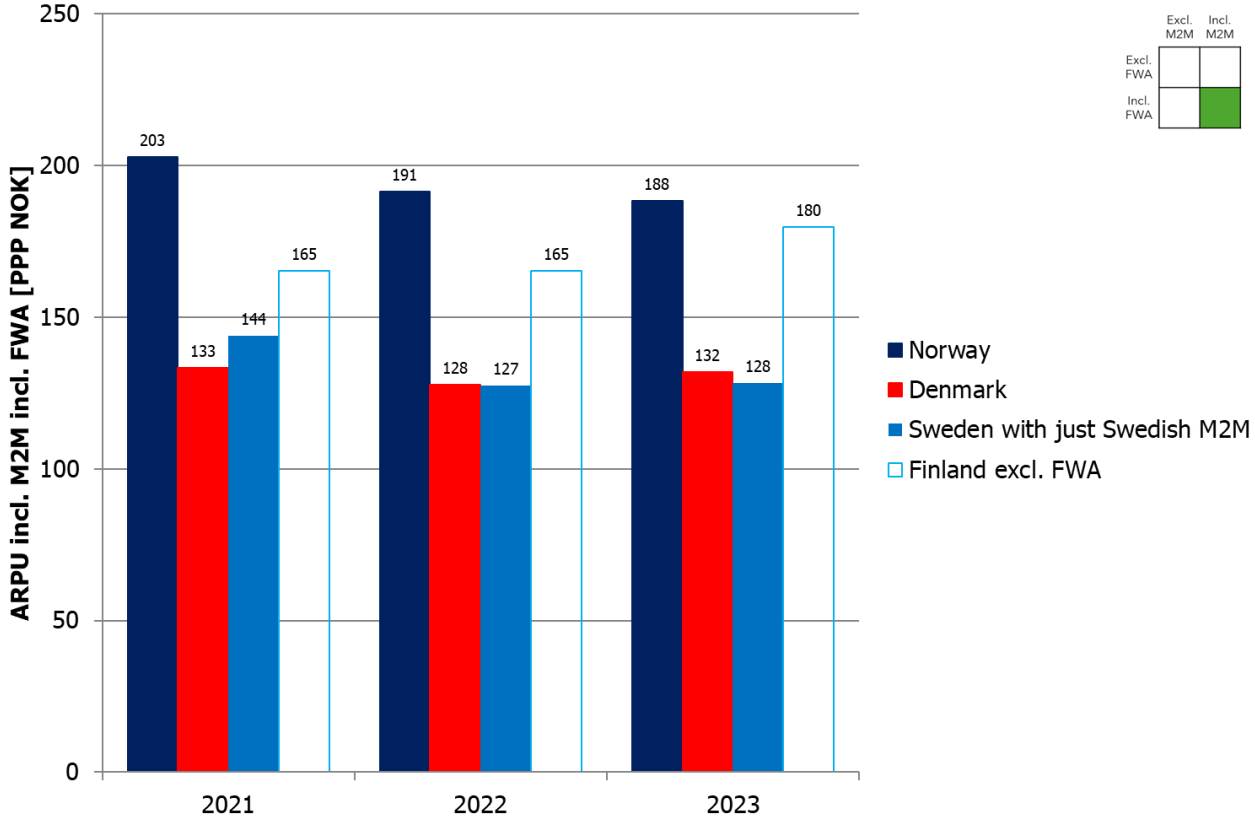

Figure 11. Comparison of PPP mobile ARPU incl. M2M incl. FWA in Norway, Denmark, Sweden, and Finland 2021, 2022 and 2023. Finland is just indicated due to insufficient input data [source: Nkom, SDFI, PTS, Traficom, OECD, operator reports for 2023 for Finland and Denmark as regulators have not yet reported revenue].

Also in PPP terms, Norway had a much higher mobile ARPU than Denmark and Sweden.

The Norwegian revenue per mobile subscription including M2M and including FWA is, both before and after compensation for differences in purchasing power, much higher than in Denmark and Sweden.

Those were the four ARPU charts that include M2M. The section will now be finished with four ARPU charts that exclude M2M.

Figure 12 compares the mobile ARPU excluding M2M and excluding FWA. Finland's bar is dimmed to indicate that an acceptable assumption (M2M revenues are zero) has been made. Denmark and Sweden are just indicative as FWA can't be excluded.

Norway's ARPU level of **288 NOK** in 2023 has increased since 2021 and 2022. The Norwegian ARPU excluding M2M and excluding FWA is much higher than in Finland.

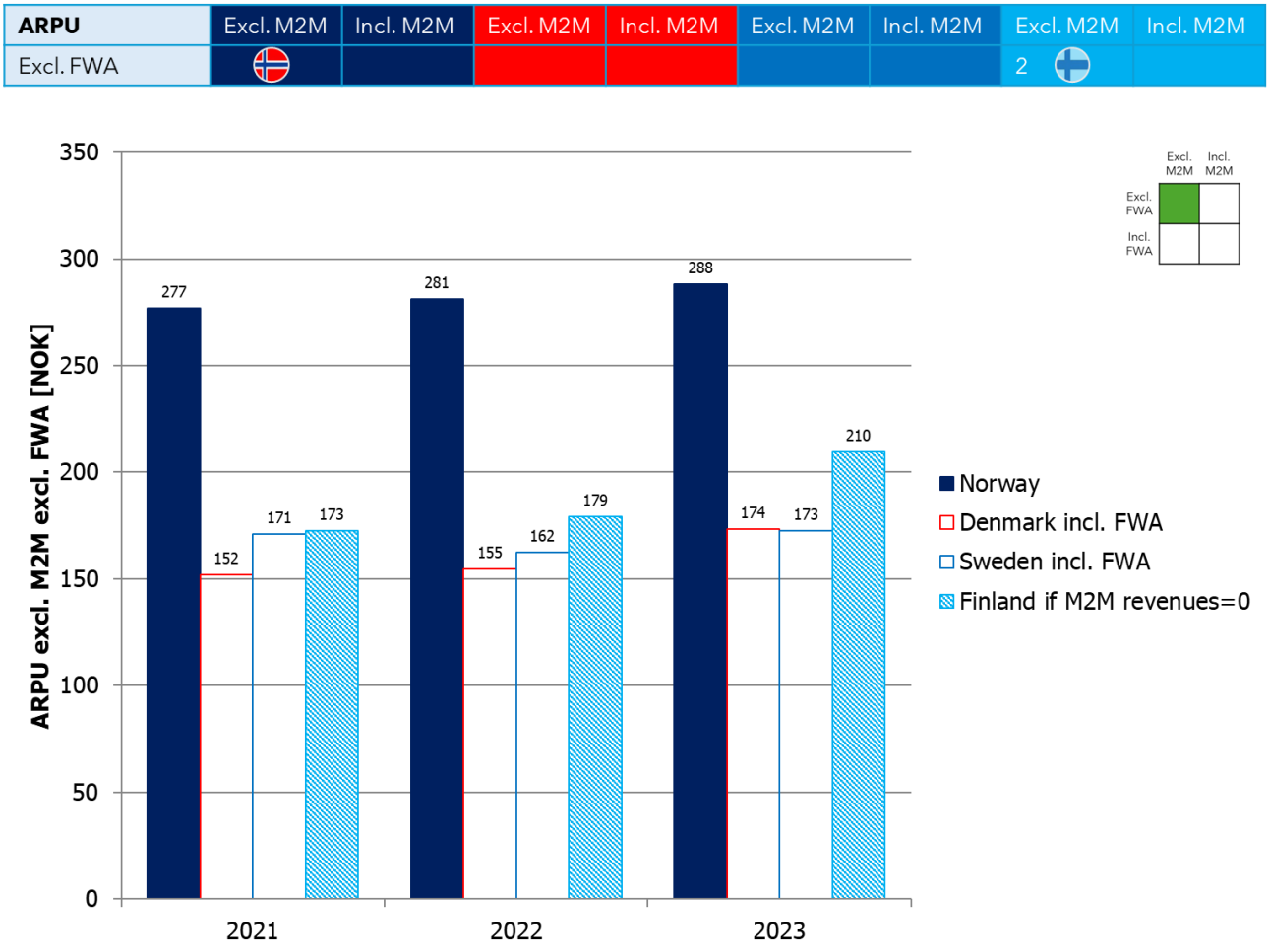

Figure 12. Comparison of mobile ARPU excl. M2M excl. FWA in Norway, Denmark, Sweden, and Finland 2021, 2022 and 2023. An assumption of M2M revenues being zero has been made for Finland. Denmark and Sweden are just indicated due to insufficient input data [source: Nkom, SDFI, PTS, Traficom, operator reports for 2023 for Finland and Denmark as regulators have not yet reported revenue].

The next graph is recalculated into purchasing power parity NOK (PPP NOK).

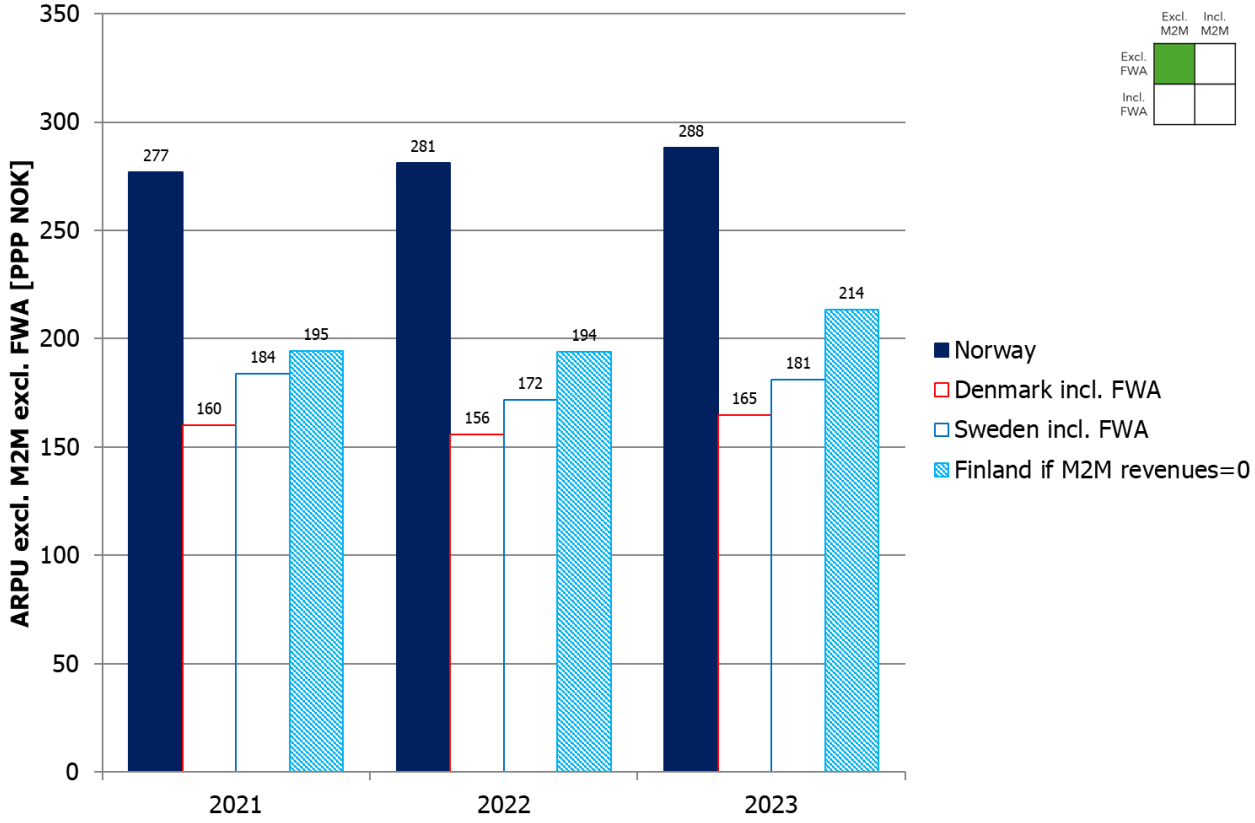

Figure 13. Comparison of PPP mobile ARPU excl. M2M excl. FWA in Norway, Denmark, Sweden, and Finland 2021, 2022 and 2023. An assumption of M2M revenues being zero has been made for Finland. Denmark and Sweden are just indicated due to insufficient input data [source: Nkom, SDFI, PTS, Traficom, OECD, operator reports for 2023 for Finland and Denmark as regulators have not yet reported revenue].

Norway's ARPU level of **288 NOK** in 2023 has increased since 2021 and 2022. The Norwegian ARPU excluding M2M and excluding FWA is much higher than in Finland also in PPP terms.

The Norwegian revenue per mobile subscription excluding M2M and excluding FWA is, both before and after compensation for differences in purchasing power, much higher than in Finland.

Let's now finish this section by including FWA revenues and subscribers and see how that changes the ARPU levels. This allows for an apple-to-apple comparison between Norway, Denmark and Sweden but leaves out Finland. For Denmark an assumption of M2M revenues being zero has been made.

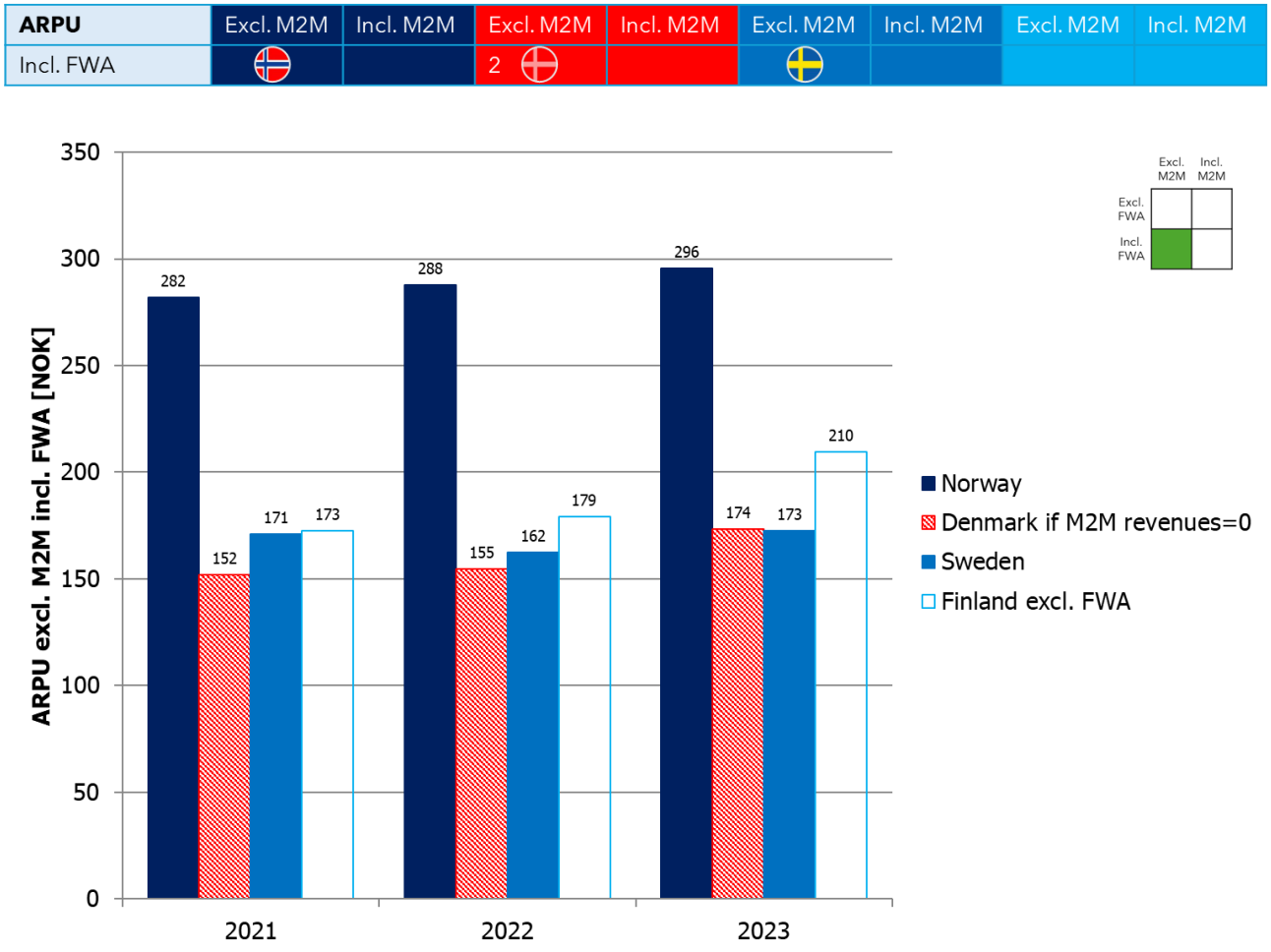

Figure 14. Comparison of mobile ARPU excl. M2M incl. FWA in Norway, Denmark, Sweden, and Finland 2021, 2022 and 2023. An assumption of M2M revenues being zero has been made for Denmark. Finland is just indicated due to insufficient input data [source: Nkom, SDFI, PTS, Traficom, operator reports for 2023 for Finland and Denmark as regulators have not yet reported revenue].

Norway's mobile ARPU excluding M2M but including FWA was **296 NOK** in 2023, higher than in 2022 (288 NOK) and in 2021 (282 NOK). In NOK terms, Denmark and Sweden had much lower ARPU than Norway. The weakening of the NOK vs. the DKK in 2023 makes the ARPU growth in Denmark look stronger.

The next graph is recalculated into purchasing power parity NOK (PPP NOK).

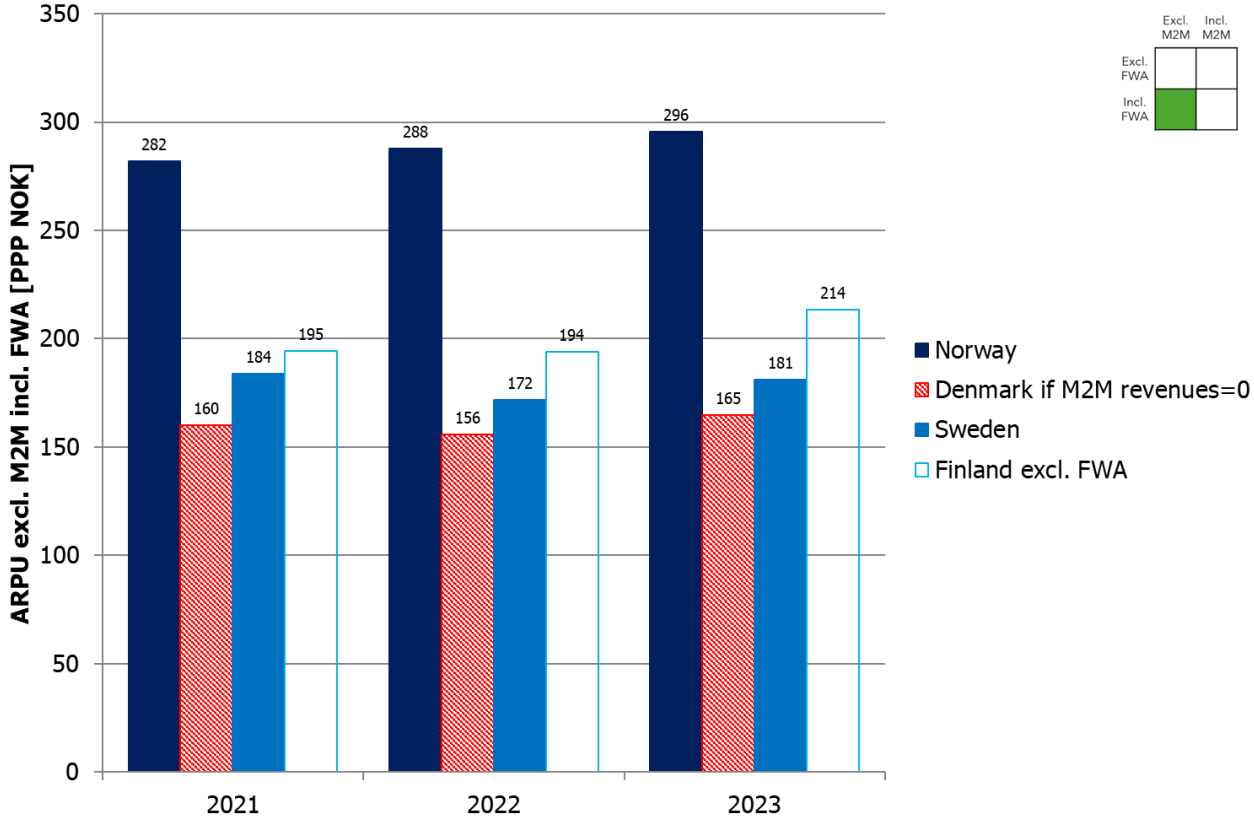

Figure 15. Comparison of PPP mobile ARPU excl. M2M incl. FWA in Norway, Denmark, Sweden, and Finland 2021, 2022 and 2023. An assumption of M2M revenues being zero has been made for Denmark. Finland is just indicated due to insufficient input data [source: Nkom, SDFI, PTS, Traficom, OECD, operator reports for 2023 for Finland and Denmark as regulators have not yet reported revenue].

Also in PPP terms, Norway had a much higher mobile ARPU than Denmark and Sweden.

The Norwegian revenue per mobile subscription excluding M2M but including FWA is, both before and after compensation for differences in purchasing power, much higher than in Denmark and Sweden.

6 Value for money

6.1 Mobile data usage

The previous section showed that the Norwegian ARPU, also after purchasing power parity adjustment, is higher than Denmark, Sweden, and Finland. Towards the end of this section, we compare the ARPU levels with the mobile data usage to give an idea of how much data mobile subscribers consume for that ARPU. It's an attempt to assess the value for money[15].

Figure 16 compares the mobile data usage per subscription including M2M but excluding FWA across our countries. Finland is one of the world leaders[16] in average mobile data usage and dominates over the other Nordic countries with an average of 36.5 GB used per subscription per month in 2023.

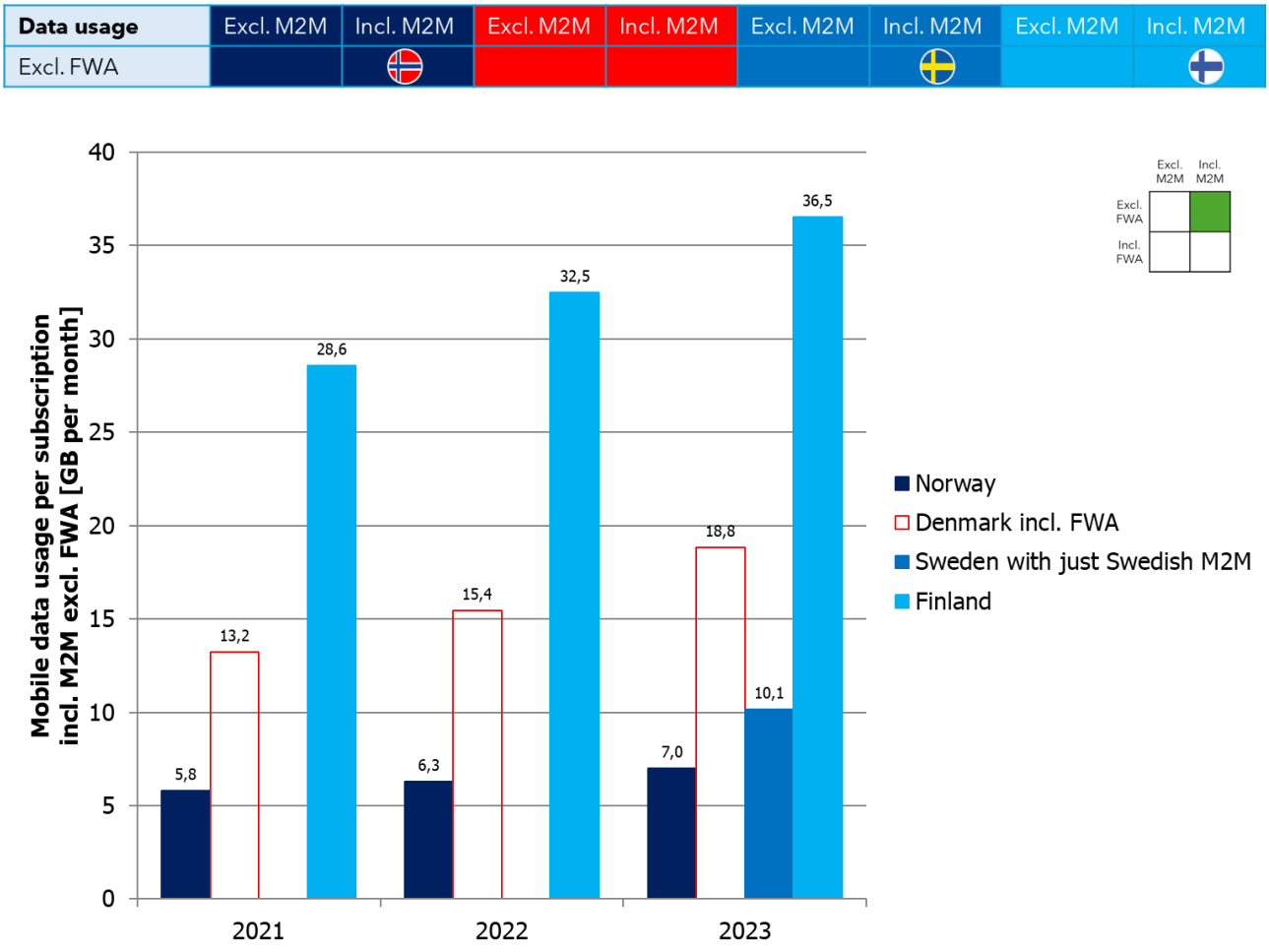

Figure 16. Average mobile data usage per mobile subscription incl. M2M excl. FWA for Norway, Denmark, Sweden, and Finland 2021, 2022 and 2023. Only 2023 usage available for Sweden as PTS changed the definition of FWA from 2021 to 2022, not allowing for an average number of FWA users to be calculated prior to 2023. Denmark is just indicated due to insufficient input data [source: Nkom, SDFI, PTS, Traficom, compiled by Tefficient].

[15] Although mobile data isn't the only mobile service, most mobile plans sold in the Nordics come with unlimited call minutes and SMS/MMS – in contrast to mobile data which outside of Finland most often is limited. This makes data the price-defining parameter.
[16] See Tefficient's public analyses on the topic, e.g. https://tefficient.com/data-only-drives-traffic-the-same-cant-be-said-for-5g/

The average mobile data usage of Norway was 7.0 GB per subscription per month in 2023 – significantly lower than Finland, but also lower than Sweden.

Figure 17 below compares the mobile data usage per subscription including M2M and including FWA.

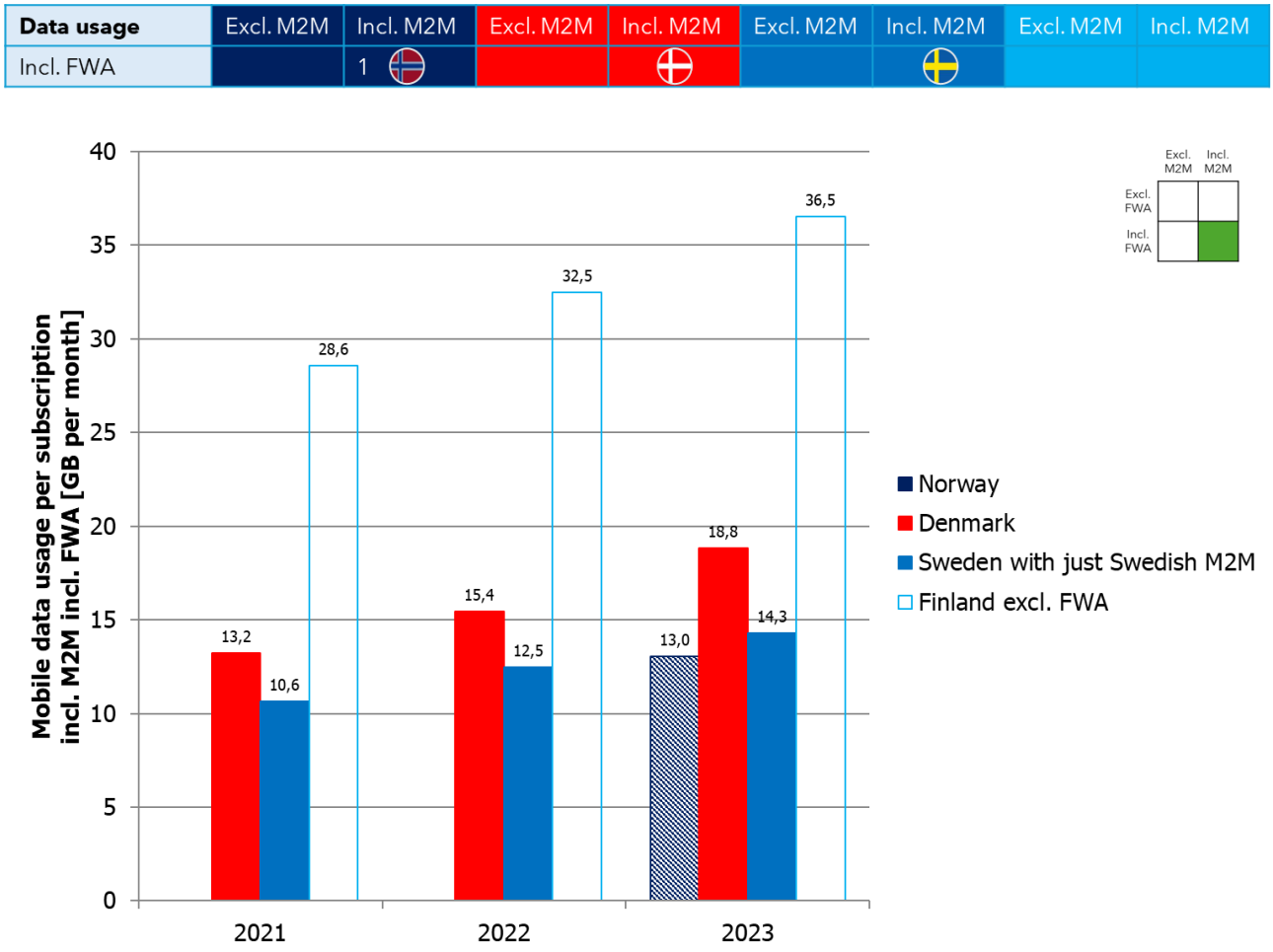

Figure 17. Average mobile data usage per mobile subscription incl. M2M incl. FWA for Norway, Denmark, Sweden, and Finland 2021, 2022 and 2023. The value for Norway assumes that the FWA usage of other providers is the same as for Telenor's FWA users. Data exists only for 2023. Finland is just indicated due to insufficient input data [source: Nkom, SDFI, PTS, Traficom, compiled by Tefficient].

Although FWA traffic is not available for Finland and therefore can't be added, the Finnish usage is still the highest. Denmark had the highest usage of the other three countries with 18.8 GB per month in 2023. Sweden had 14.3 GB and Norway's estimated[17] usage was, also when including FWA, the lowest in the Nordics with 13.0 GB.

The average mobile data usage per mobile subscription incl. M2M is the lowest in Norway – regardless of excluding or including FWA.

[17] The value for Norway assumes that the FWA usage of other providers is the same as for Telenor's FWA users. Data exists only for 2023.

Let's now exclude M2M from the subscription bases and traffic.

Figure 18 below compares the mobile data usage per subscription excluding M2M[18] and excluding FWA. Finland dominates over the other Nordic countries with an average of 43.4 GB used per subscription per month in 2023 (in their case assuming that M2M traffic is zero). Sweden had 14.6 GB. Norway is last with 11.3 GB.

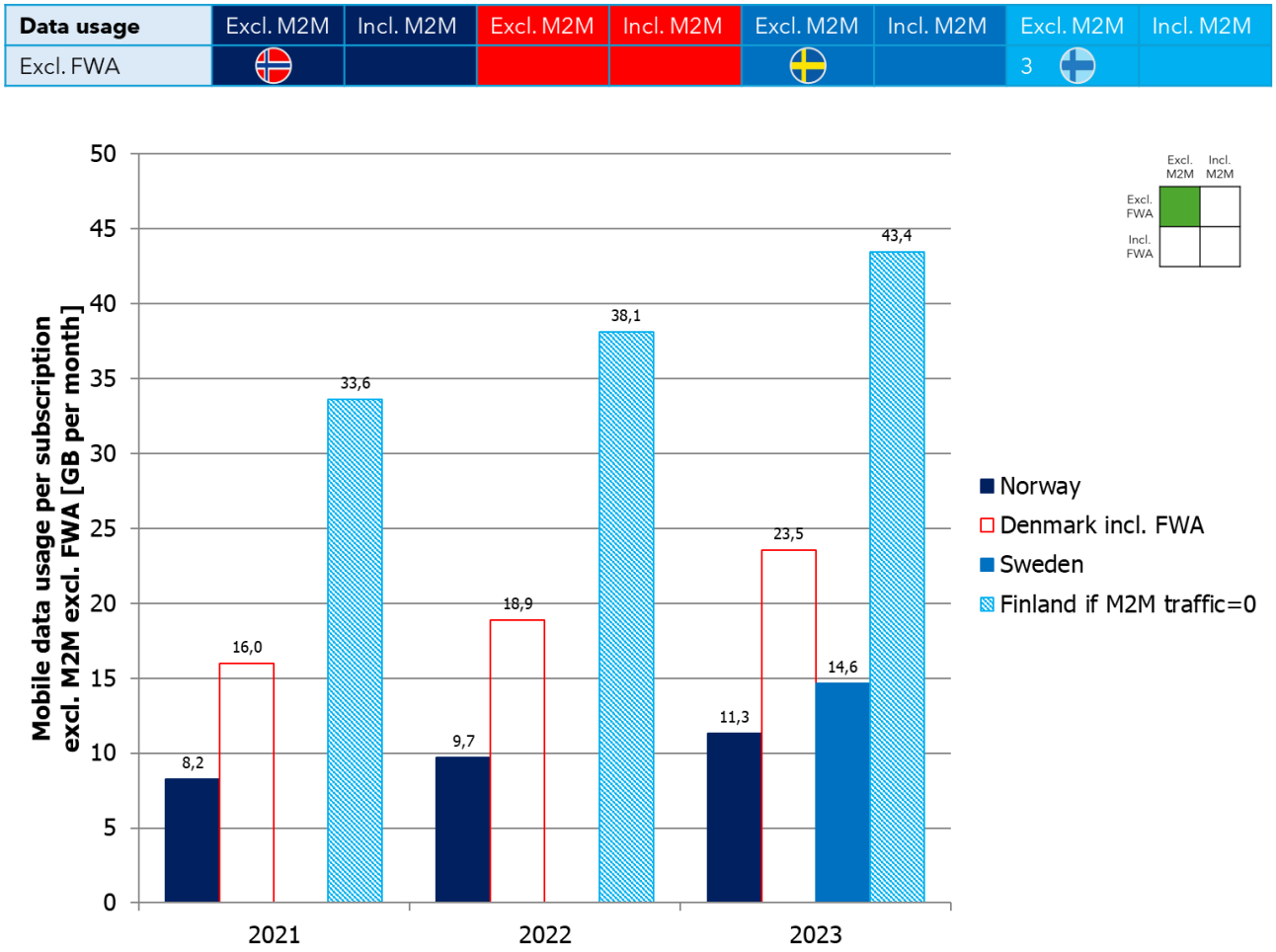

Figure 18. Average mobile data usage per mobile subscription excl. M2M excl. FWA for Norway, Denmark, Sweden, and Finland 2021, 2022 and 2023. An assumption of M2M data traffic being zero has been made for Finland. Only 2023 usage available for Sweden as PTS changed the definition of FWA from 2021 to 2022, not allowing for an average number of FWA users to be calculated before 2023. Denmark is just indicated due to insufficient input data [source: Nkom, SDFI, PTS, Traficom, compiled by Tefficient].

Finally, a comparison of the mobile data usage per subscription excluding M2M but including FWA.

[18] Denmark and Finland aren't separating out the M2M data traffic (Norway and Sweden do) but from the Norwegian and Swedish data it's clear that the M2M data traffic is marginal compared to the overall data traffic – 1.1% in Norway and 0.6% in Sweden in 2023 when excluding FWA traffic.

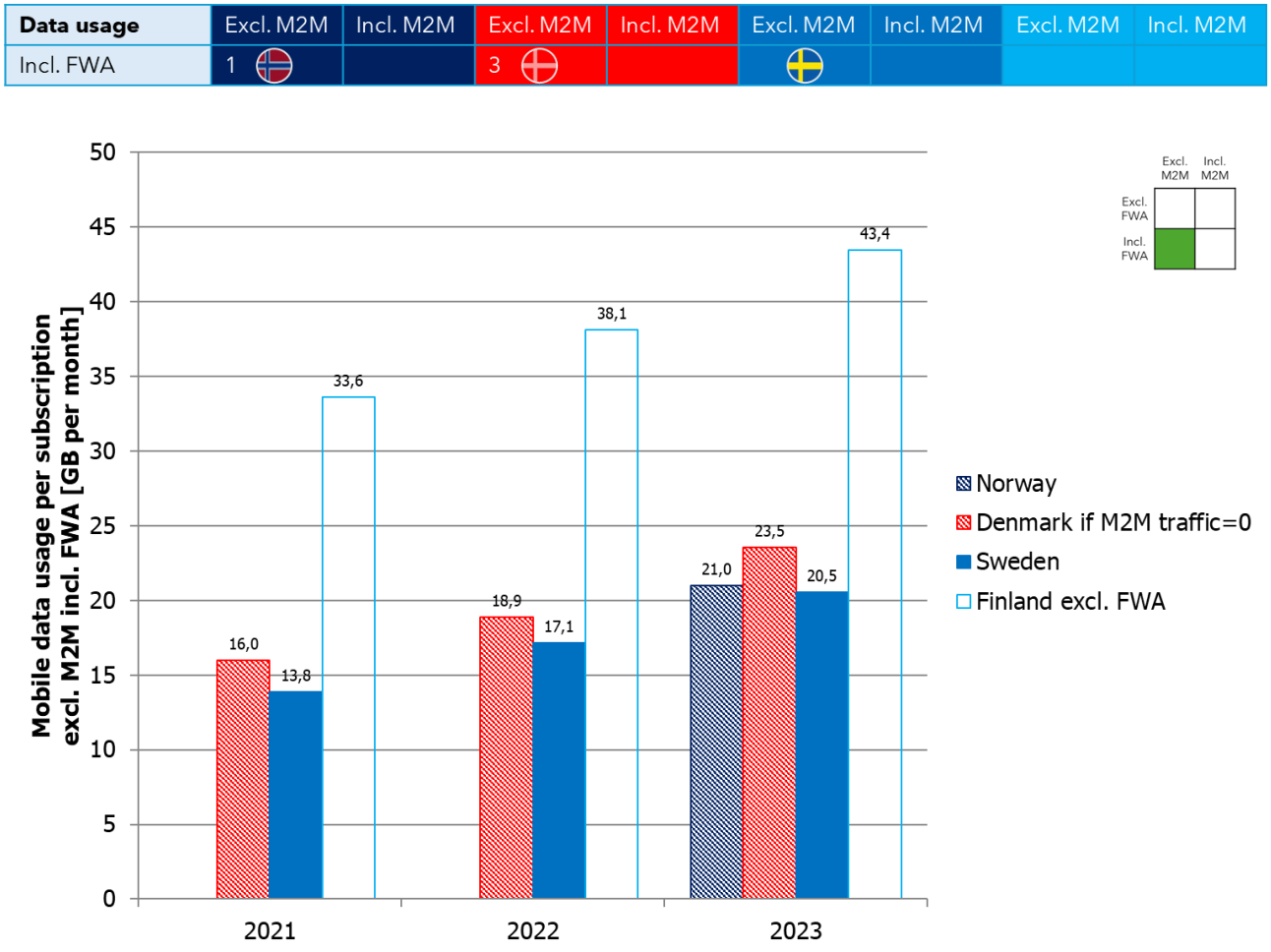

Figure 19. Average mobile data usage per mobile subscription excl. M2M incl. FWA for Norway, Denmark, Sweden, and Finland 2021, 2022 and 2023. An assumption of M2M data traffic being zero has been made for Denmark. The value for Norway assumes that the FWA usage of other providers is the same as for Telenor's FWA users. Data exists only for 2023. Finland is just indicated due to insufficient input data [source: Nkom, SDFI, PTS, Traficom, compiled by Tefficient].

When excluding M2M, but including FWA, the average mobile data usage of Norway is estimated to 21.0 GB per subscription per month in 2023 – slightly higher than Sweden's 20.5 GB. Denmark's usage is higher, 23.5 GB, but Finland still has a comfortable lead although FWA traffic can't be included for Finland.

The average mobile data usage per mobile subscription excl. M2M is the lowest in Norway when excluding FWA – but if including FWA, Norway's estimated usage is slightly higher than Sweden's but still lower than Denmark's and Finland's.

In all but one of our four usage charts, Norway has the lowest data usage. But is Norway closing some of the gap over time? Yes and no. Figure 20 shows the year-on-year development of the mobile data traffic per country including M2M (FWA is excluded or included, depending on what is reported). In certain years – 2017 and 2021 – Norway had the fastest growth, in percent, among our four markets. But in 2018 and 2019, Norway had the slowest growth. In 2023, Norway's mobile data traffic grew faster than Finland's and about as fast as Sweden's (when excluding FWA). Denmark's traffic grew the fastest but then we must remember that the Danish traffic includes FWA.

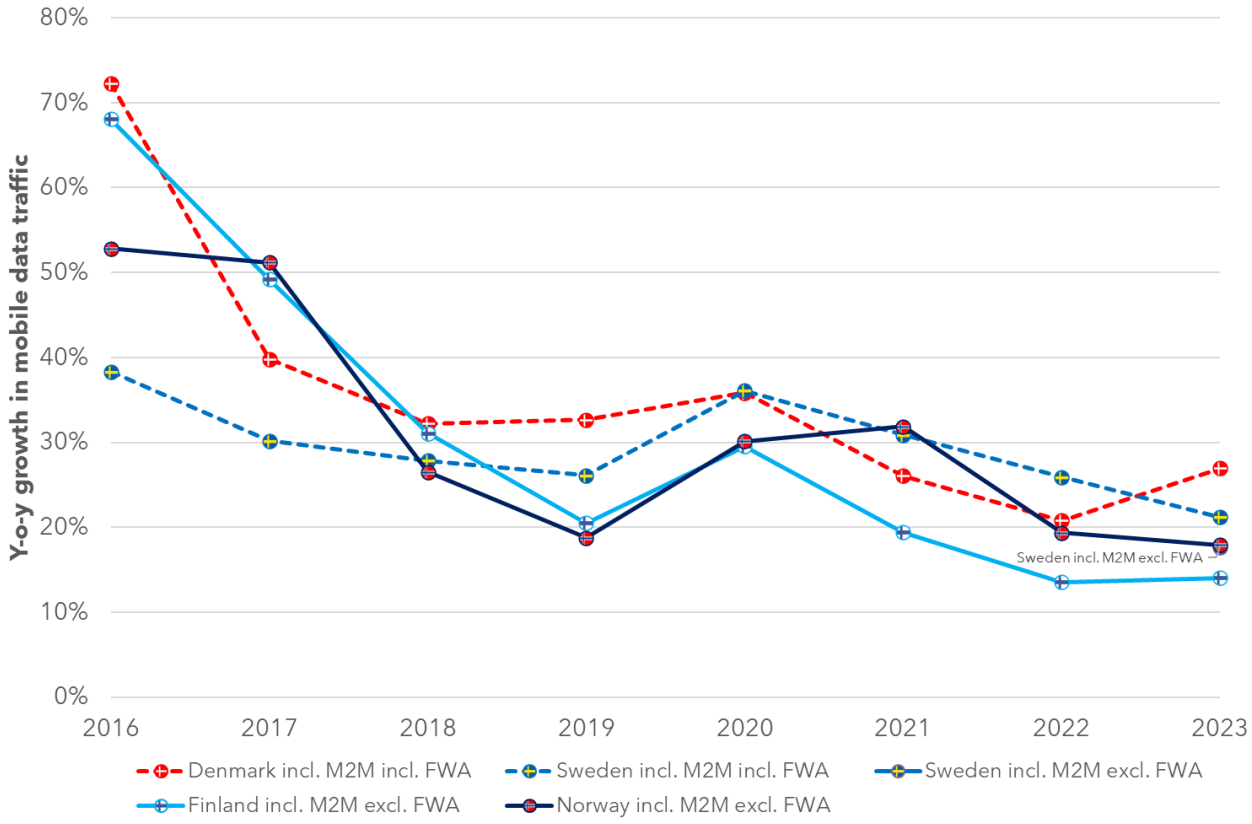

Figure 20. Y-o-y development in mobile data traffic incl. M2M for Norway, Denmark, Sweden, and Finland 2016-2023. Sweden excl. FWA can only be calculated for 2023 (marker hidden behind Norway). Norway incl. FWA can't yet be calculated as an estimation is only available for 2023 [source: Nkom, SDFI, PTS, Traficom, compiled by Tefficient].

6.2 Total mobile service revenue per consumed GB

Could Norway's low mobile data usage and just-usual growth rate have something to do with the cost of mobile data? To assess this, we have calculated the **total mobile service revenue per consumed GB**[19].

Just like with ARPU, we need a total of eight charts to cover all possible combinations of M2M and FWA with and without purchasing power adjustment. We start with a chart including M2M and excluding FWA.

[19] The reason why we use the total mobile service revenue, not just the mobile service revenue associated with mobile data, is the way mobile plans typically are packaged today – with an unlimited number of minutes and SMS/MMS messages and a limited or unlimited number of GBs. With this, there is no way to separate the total service revenue into voice, messaging, and data.

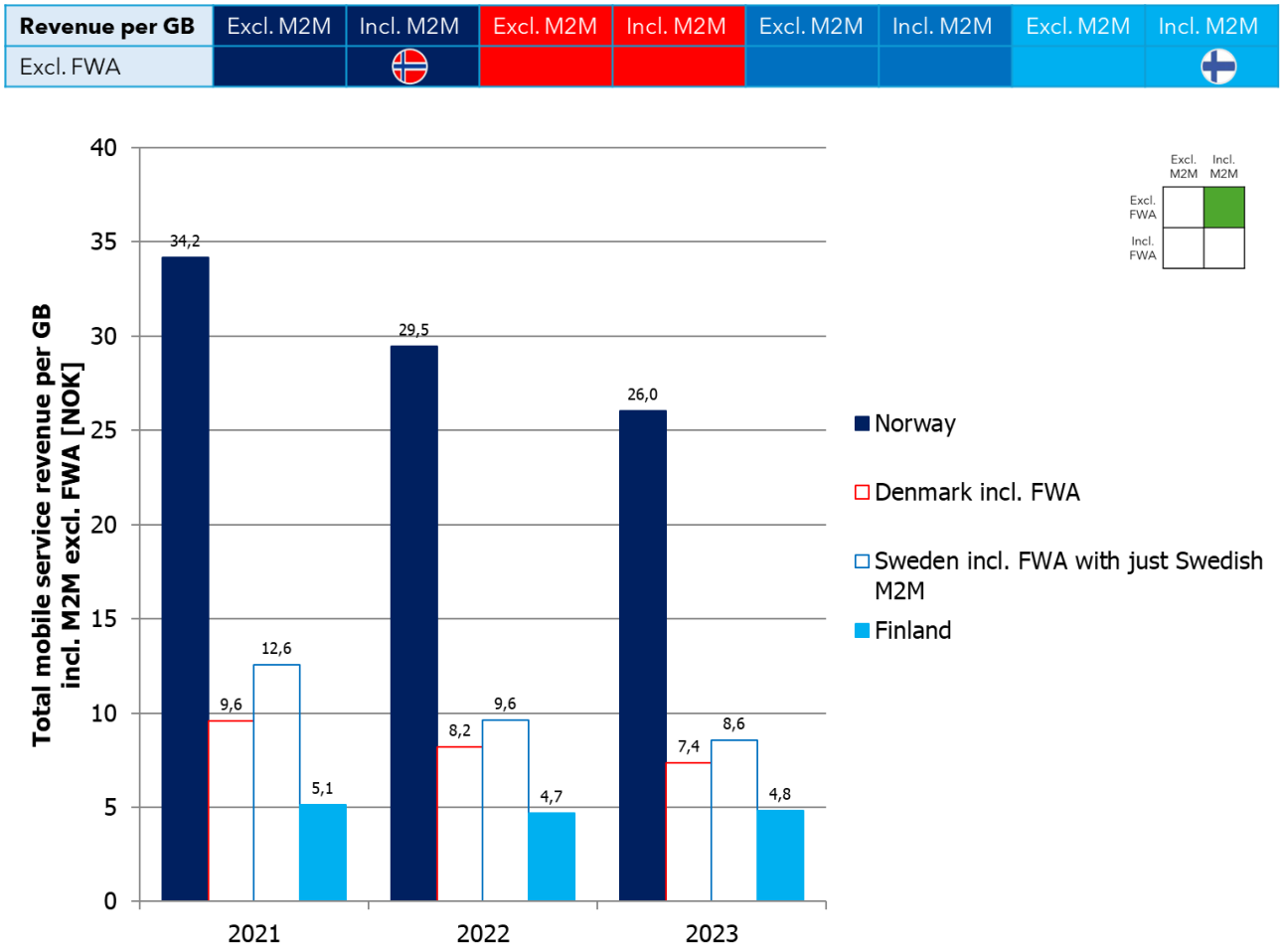

Figure 21. Total mobile service revenue in NOK per consumed GB incl. M2M excl. FWA for Norway, Denmark, Sweden, and Finland 2021, 2022 and 2023. Denmark and Sweden are just indicated due to insufficient input data [source: Nkom, SDFI, PTS, Traficom, operator reports for 2023 for Finland and Denmark as regulators have not yet reported revenue, compiled by Tefficient].

Figure 21 shows the figures in pure NOK if including M2M and excluding FWA (where possible). The revenue per GB in Norway in 2023 was 26.0 NOK – 5.4 times higher than in Finland.

Two factors are behind this:

1) The higher ARPU in Norway, see section 5,

2) The lower mobile data usage in Norway, see section 6.1.

Now the same graph but after purchasing power adjustments.

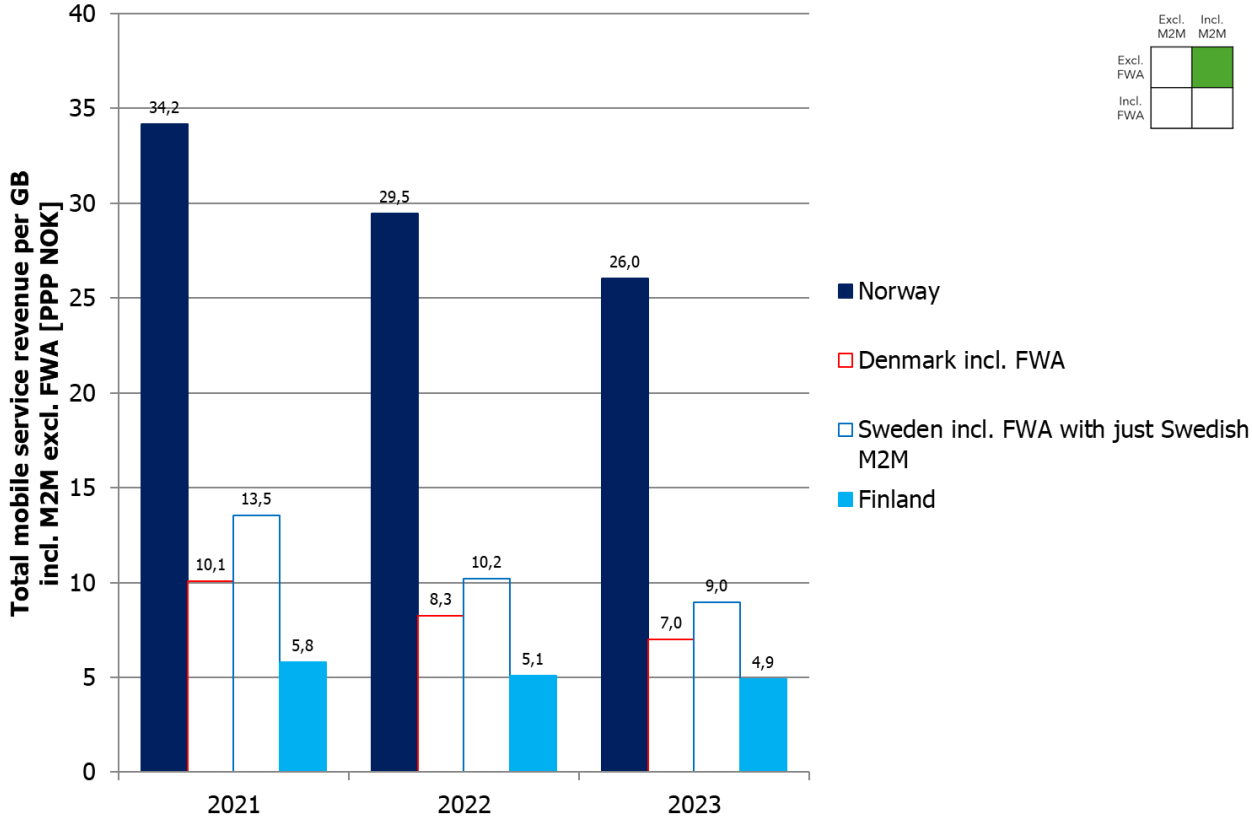

Figure 22. Total mobile service revenue in PPP NOK per consumed GB incl. M2M excl. FWA for Norway, Denmark, Sweden, and Finland 2021, 2022 and 2023. Denmark and Sweden are just indicated due to insufficient input data [source: Nkom, SDFI, PTS, Traficom, OECD, operator reports for 2023 for Finland and Denmark as regulators have not yet reported revenue, compiled by Tefficient].

The PPP adjusted revenue per GB in Norway in 2023 was 5.3 times higher than in Finland.

Next to the graphs that include FWA.

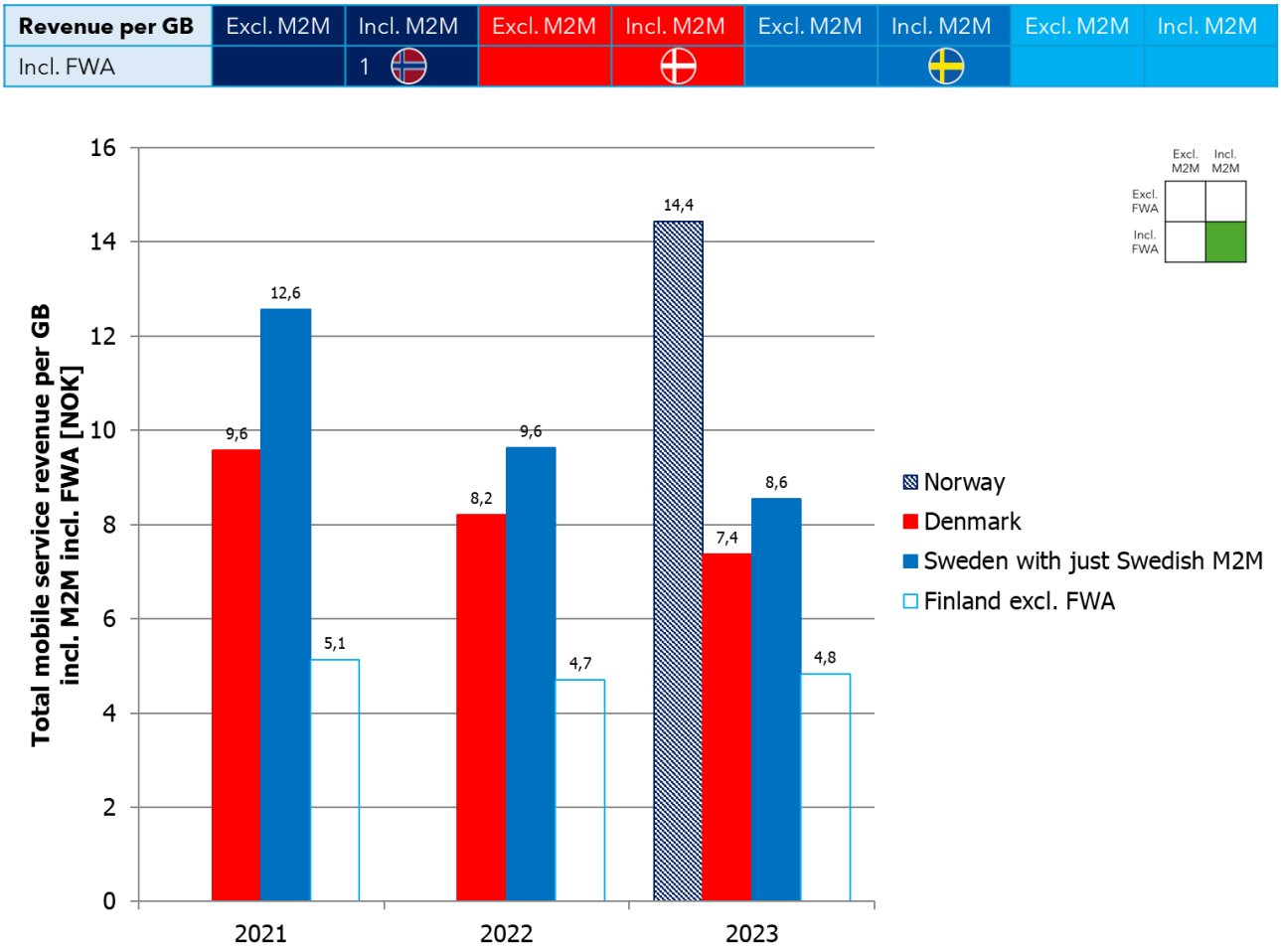

Figure 23. Total mobile service revenue in NOK per consumed GB incl. M2M incl. FWA for Norway, Denmark, Sweden, and Finland 2021, 2022 and 2023. The value for Norway assumes that the FWA usage of other providers is the same as for Telenor's FWA users. Data exists only for 2023. Finland is just indicated due to insufficient input data [source: Nkom, SDFI, PTS, Traficom, operator reports for 2023 for Finland and Denmark as regulators have not yet reported revenue, compiled by Tefficient].

Figure 23 shows the figures in pure NOK if including M2M and FWA (where possible). The estimated revenue per GB in Norway in 2023 was 14.4 NOK – 1.9 times higher than in Denmark and 1.7 times higher than in Sweden.

Now the same graph but after purchasing power adjustments.

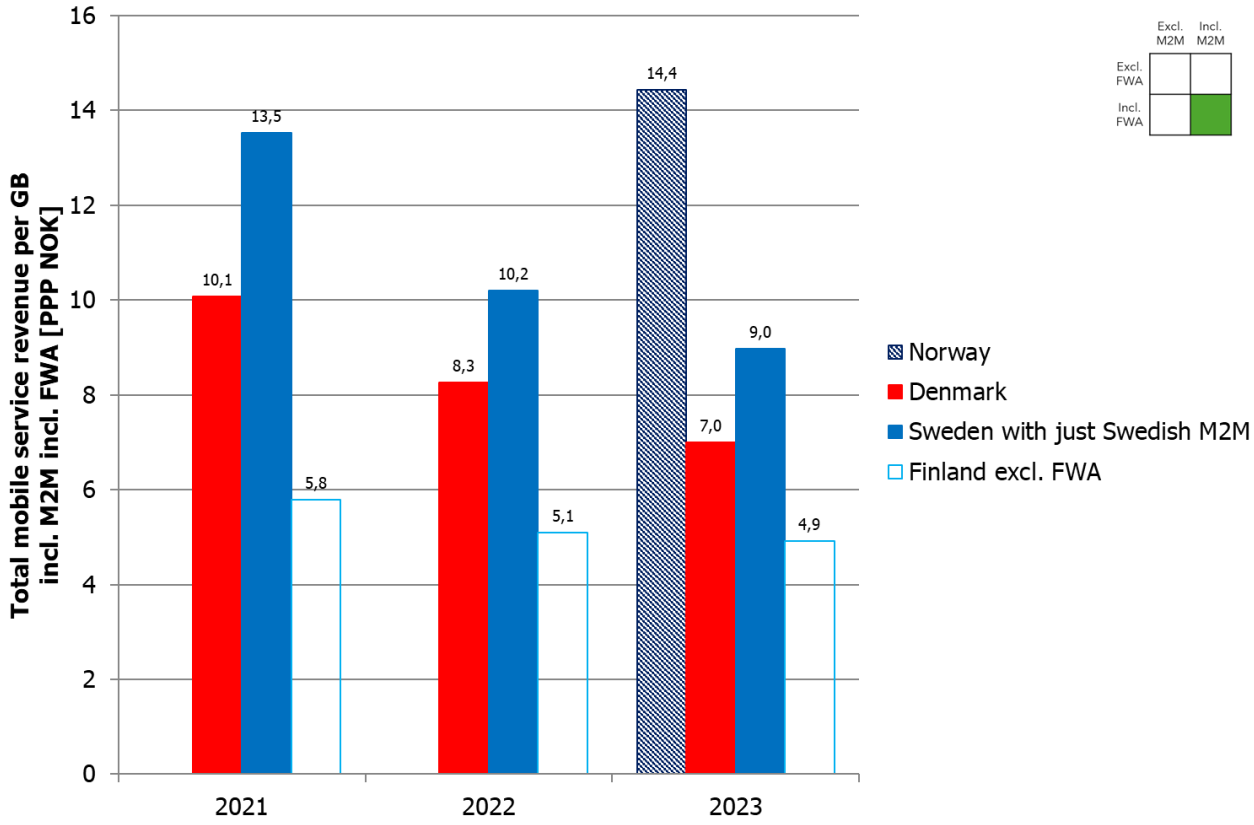

Figure 24. Total mobile service revenue in PPP NOK per consumed GB incl. M2M incl. FWA for Norway, Denmark, Sweden, and Finland 2021, 2022 and 2023. The value for Norway assumes that the FWA usage of other providers is the same as for Telenor's FWA users. Data exists only for 2023. Finland is just indicated due to insufficient input data [source: Nkom, SDFI, PTS, Traficom, OECD, operator reports for 2023 for Finland and Denmark as regulators have not yet reported revenue, compiled by Tefficient].

The PPP adjusted estimated revenue per GB in Norway in 2023 was 2.1 times higher than in Denmark and 1.6 times higher than in Sweden.

Let's now exclude M2M from the graphs where possible.

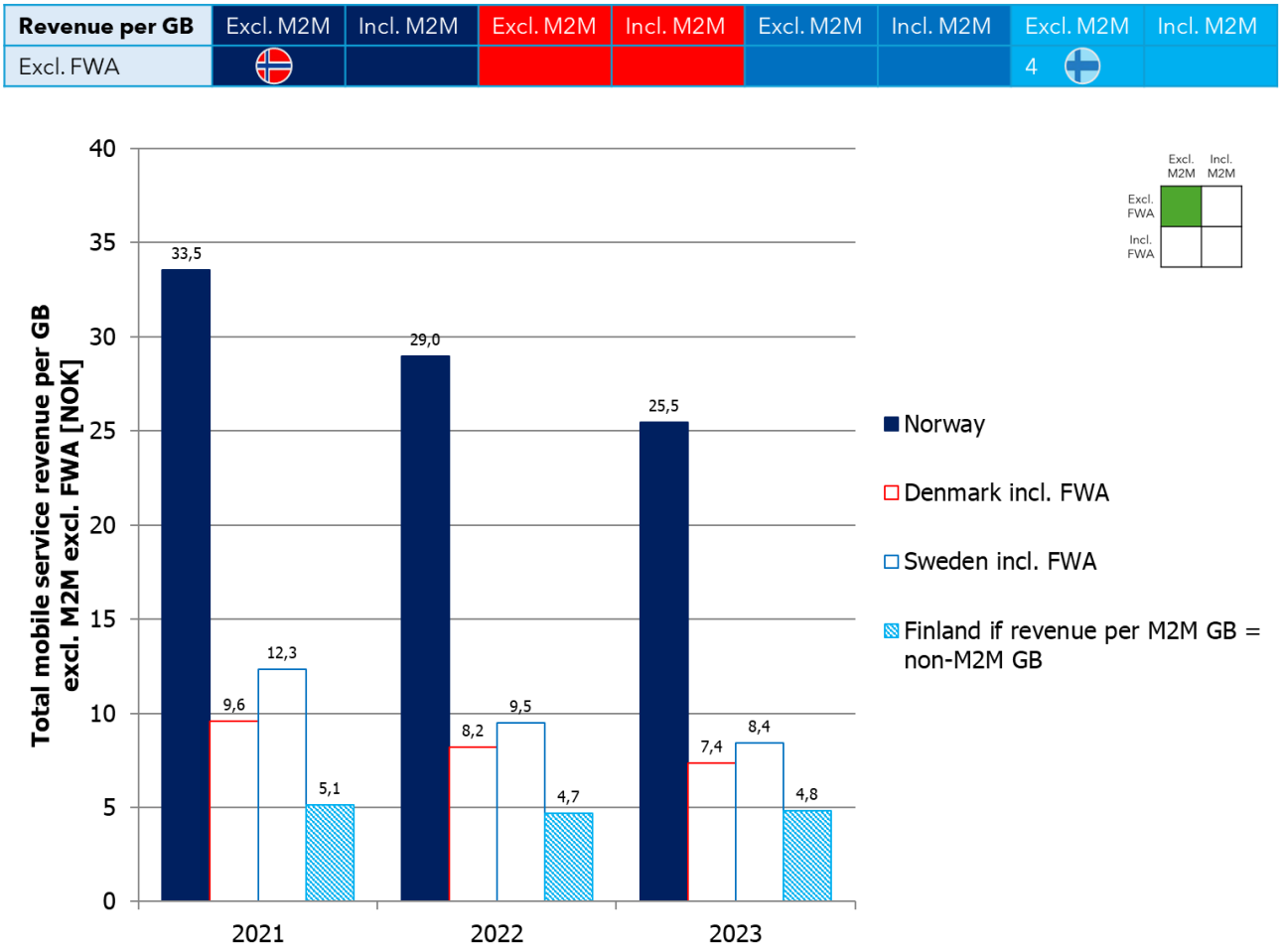

Figure 25. Total mobile service revenue in NOK per consumed GB excl. M2M excl. FWA for Norway and Sweden 2021, 2022 and 2023. An assumption of the M2M revenue per GB being the same as the non-M2M revenue per GB has been made for Finland. Denmark and Sweden are just indicated due to insufficient input data [source: Nkom, SDFI, PTS, Traficom, operator reports for 2023 for Finland and Denmark as regulators have not yet reported revenue, compiled by Tefficient].

The revenue per GB in Norway was 25.5 NOK in 2023 – 5.3 times higher than in Finland. The next graph is in PPP NOK.

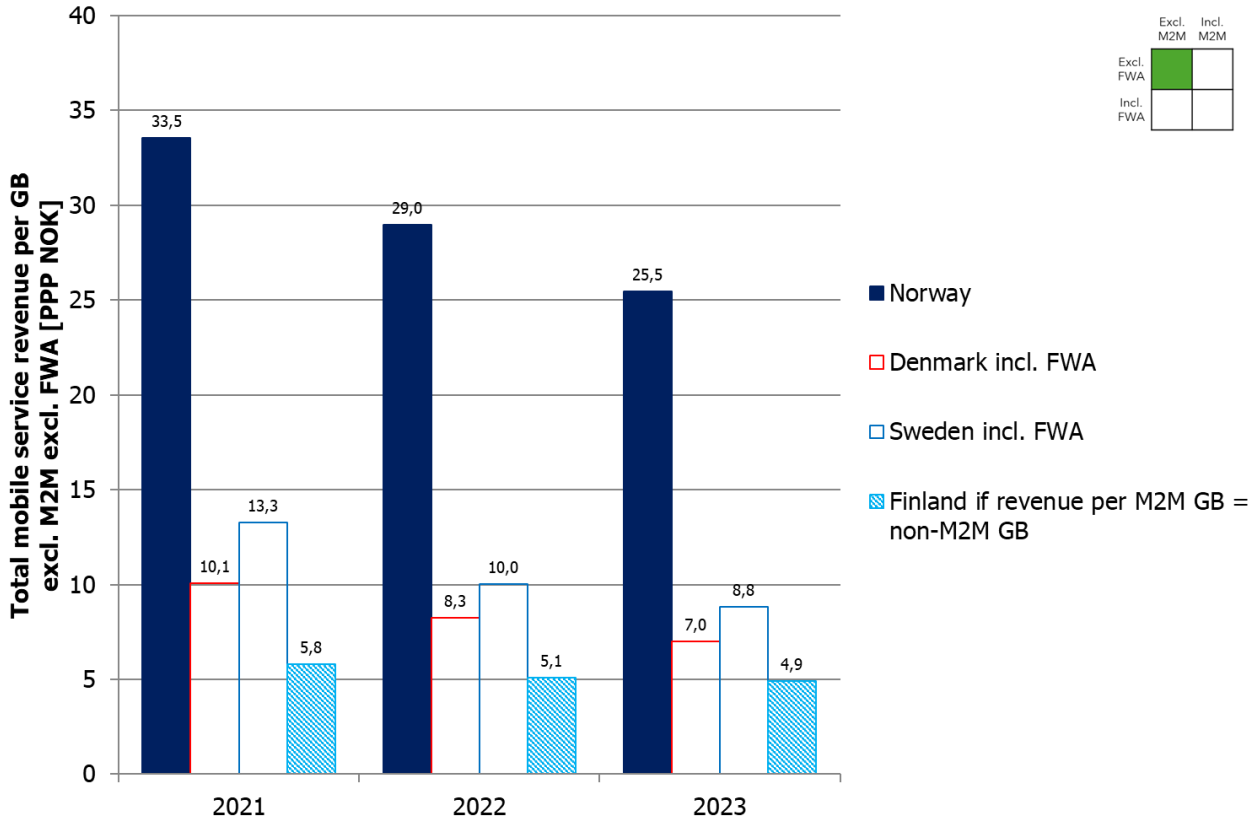

Figure 26. Total mobile service revenue in PPP NOK per consumed GB excl. M2M excl. FWA for Norway and Sweden 2021, 2022 and 2023. An assumption of the M2M revenue per GB being the same as the non-M2M revenue per GB has been made for Finland. Denmark and Sweden are just indicated due to insufficient input data [source: Nkom, SDFI, PTS, Traficom, OECD, operator reports for 2023 for Finland and Denmark as regulators have not yet reported revenue, compiled by Tefficient].

The PPP adjusted revenue per GB in Norway was, in 2023, 5.2 times higher than in Finland.

Finally, the graphs excluding M2M but including FWA.

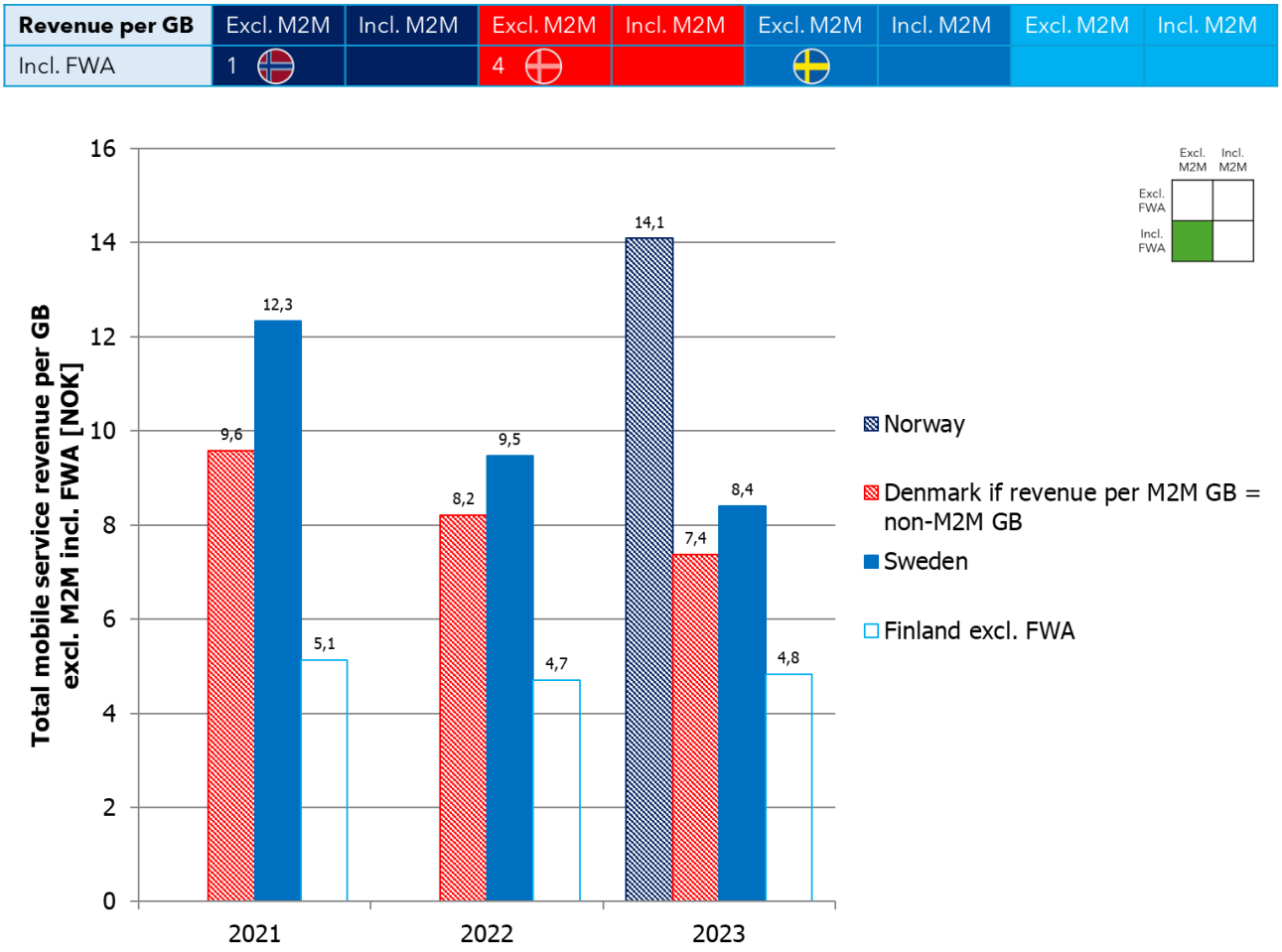

Figure 27. Total mobile service revenue in NOK per consumed GB excl. M2M incl. FWA for Norway and Sweden 2021, 2022 and 2023. An assumption of the M2M revenue per GB being the same as the non-M2M revenue per GB has been made for Denmark. Finland is just indicated due to insufficient input data [source: Nkom, SDFI, PTS, Traficom, operator reports for 2023 for Finland and Denmark as regulators have not yet reported revenue, compiled by Tefficient].

The estimated revenue per GB in Norway was 14.1 NOK in 2023 – 1.9 times higher than in Denmark and 1.7 times higher than in Sweden. The next graph is in PPP NOK.

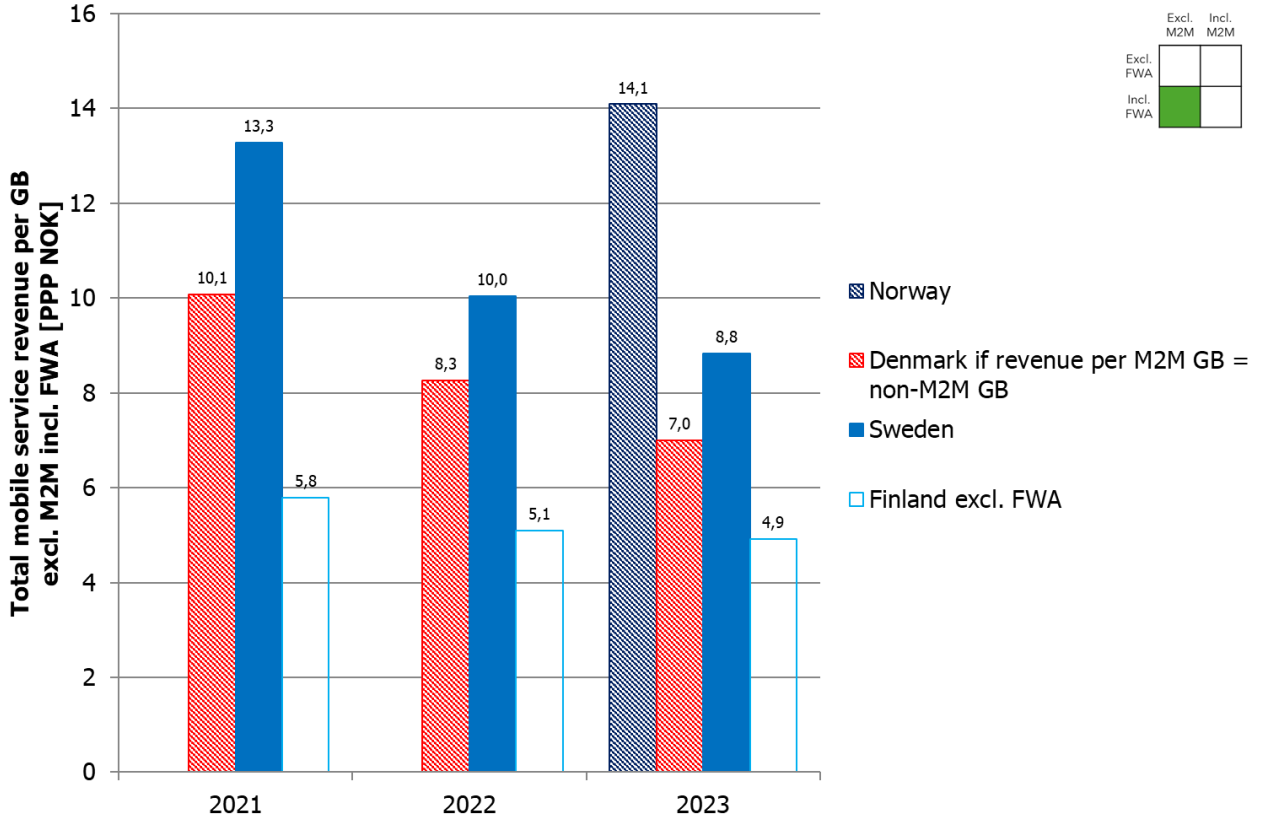

Figure 28. Total mobile service revenue in PPP NOK per consumed GB incl. M2M excl. FWA for Norway and Sweden 2021, 2022 and 2023. An assumption of the M2M revenue per GB being the same as the non-M2M revenue per GB has been made for Denmark. Finland is just indicated due to insufficient input data [source: Nkom, SDFI, PTS, Traficom, OECD, operator reports for 2023 for Finland and Denmark as regulators have not yet reported revenue, compiled by Tefficient].

The PPP adjusted estimated revenue per GB in Norway was, in 2023, 2.0 times higher than in Denmark and 1.6 times higher than in Sweden.

The total mobile service revenue per consumed GB is, before and after compensation for differences in purchasing power, between 1.6 to 5.4 times higher in Norway than in the other Nordic countries. It's likely that the high revenue per GB hampers the Norwegian usage.

6.3 Value for money: ARPU vs. usage

The following graphs compare how much mobile subscribers get for what they pay. We are comparing the ARPU from section 5 with the average mobile data usage from section 6.1 for the four possible combinations of M2M excluded/included and FWA excluded/included. Since the purchasing power adjustments didn't change any conclusions in the ARPU and revenue per GB sections, we omit the PPP cases here, comparing only the four pure NOK cases.

First the graph where M2M is included but FWA excluded:

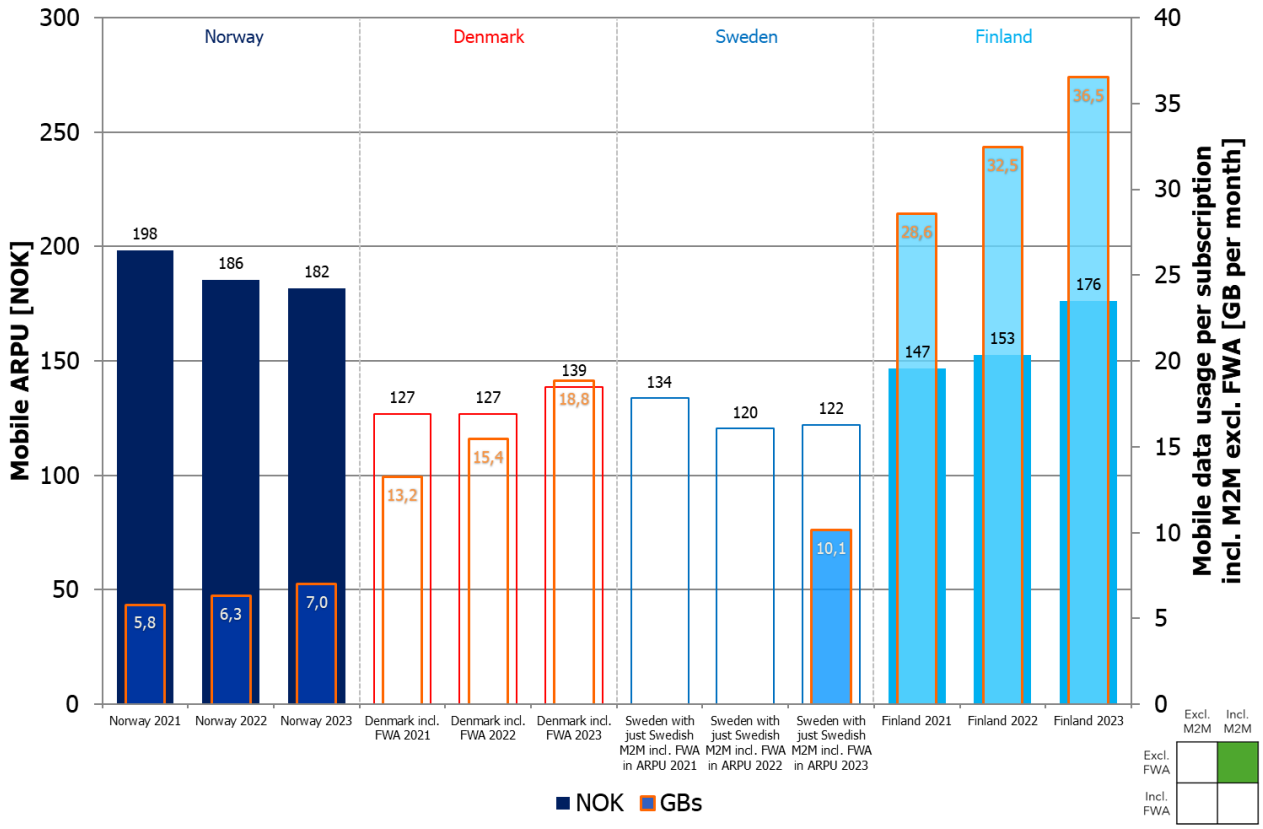

Figure 29. ARPU per mobile subscription incl. M2M excl. FWA vs. the average mobile data usage per subscription incl. M2M excl. FWA for Norway, Denmark, Sweden, and Finland 2021, 2022 and 2023. For definitions of indications and assumptions, see the respective ARPU and data usage charts [source: Nkom, SDFI, PTS, Traficom, operator reports for 2023 for Finland and Denmark as regulators have not yet reported revenue, compiled by Tefficient].

Norway's ARPU is higher than Finland's although Norway's average mobile data usage is much lower. Norway's mobile data usage was also lower than Sweden's in 2023.

In the next graph, FWA has been added.

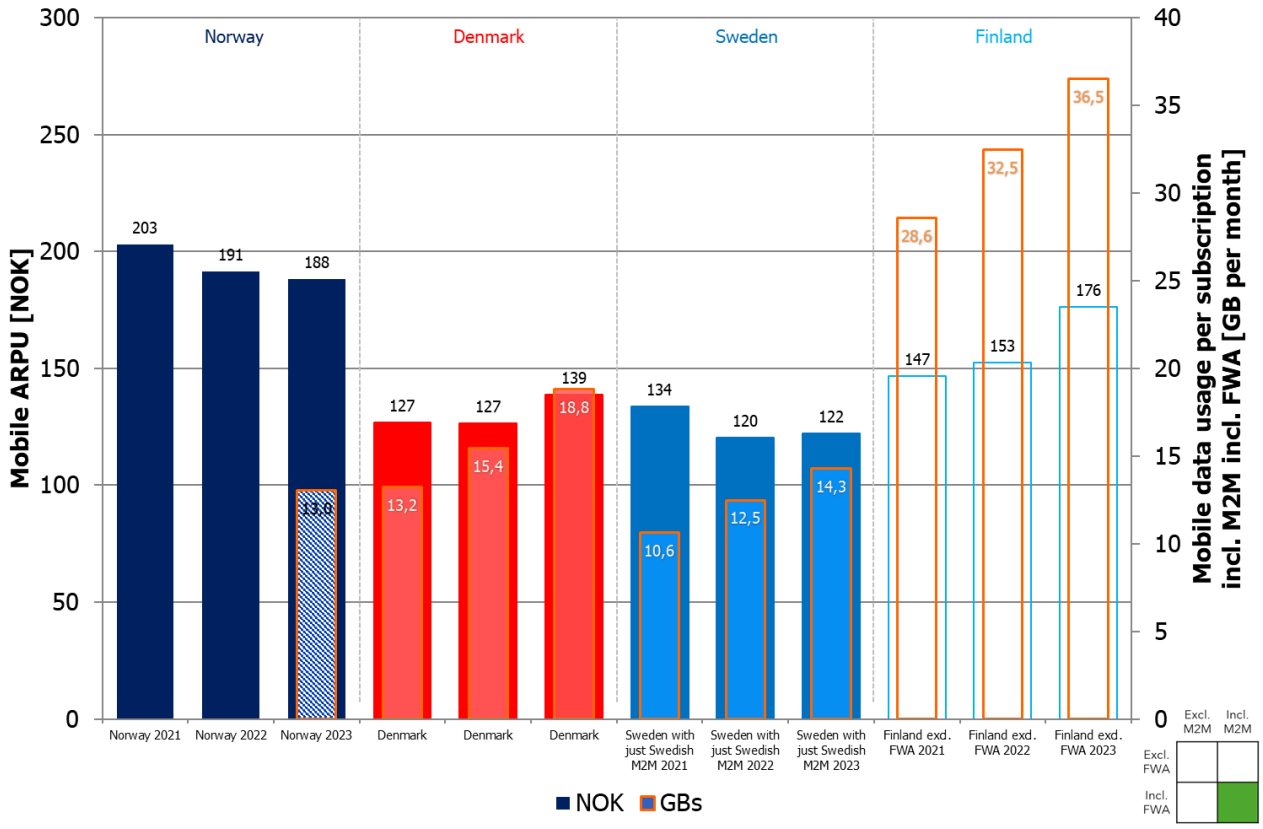

Figure 30. ARPU per mobile subscription incl. M2M incl. FWA vs. the average mobile data usage per subscription incl. M2M incl. FWA for Norway, Denmark, Sweden, and Finland 2021, 2022 and 2023. For definitions of indications and assumptions, see the respective ARPU and data usage charts [source: Nkom, SDFI, PTS, Traficom, operator reports for 2023 for Finland and Denmark as regulators have not yet reported revenue, compiled by Tefficient].

Norway's ARPU is higher than Denmark's and Sweden's ARPU although Norway's estimated average mobile data usage in 2023 was lower.

If excluding M2M from Figure 29 we get Figure 31.

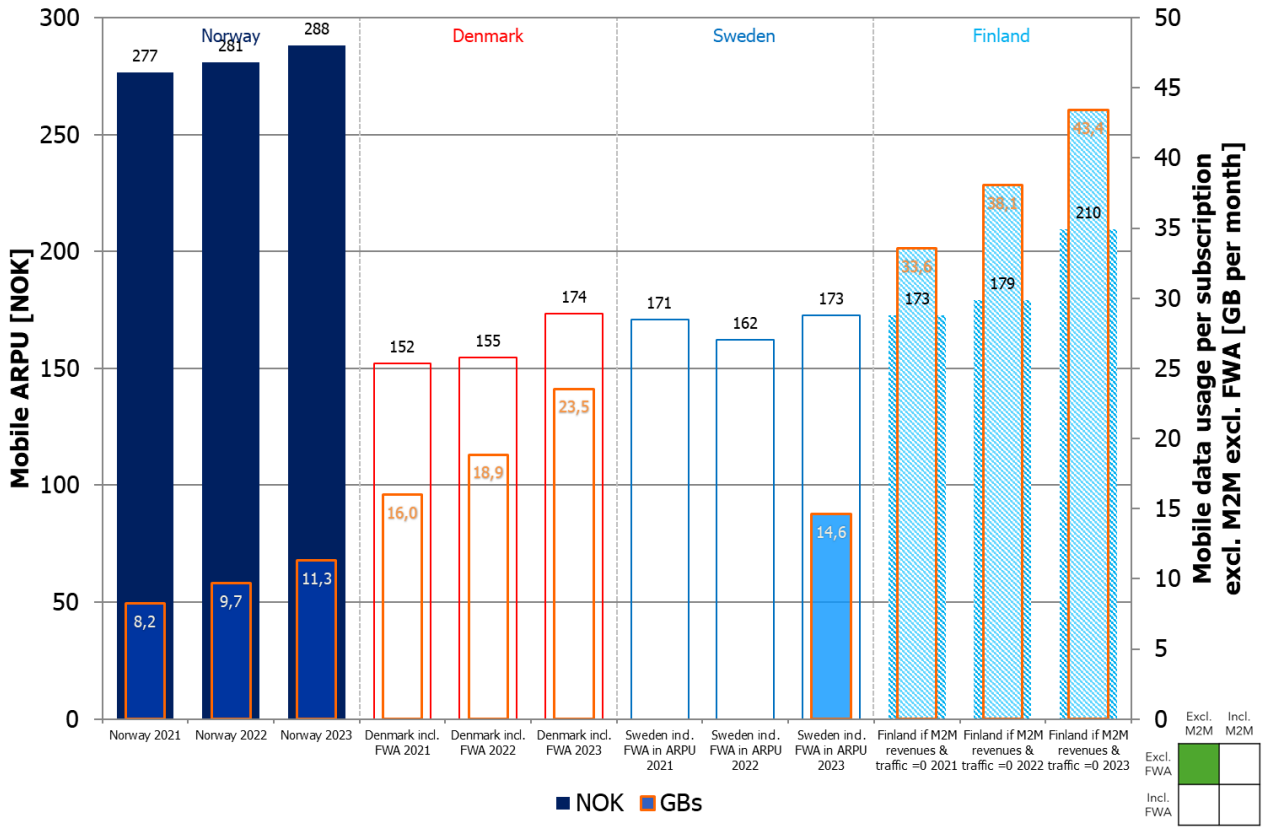

Figure 31. ARPU per mobile subscription excl. M2M excl. FWA vs. the average mobile data usage per subscription excl. M2M excl. FWA for Norway, Denmark, Sweden, and Finland 2021, 2022 and 2023. For definitions of indications and assumptions, see the respective ARPU and data usage charts [source: Nkom, SDFI, PTS, Traficom, operator reports for 2023 for Finland and Denmark as regulators have not yet reported revenue].

When excluding M2M, Norway's higher ARPU differential vs. Finland widens although the Norwegian average mobile data usage is much lower. Norway's mobile data usage was also lower than Sweden's in 2023.

In the next graph, FWA has been added.

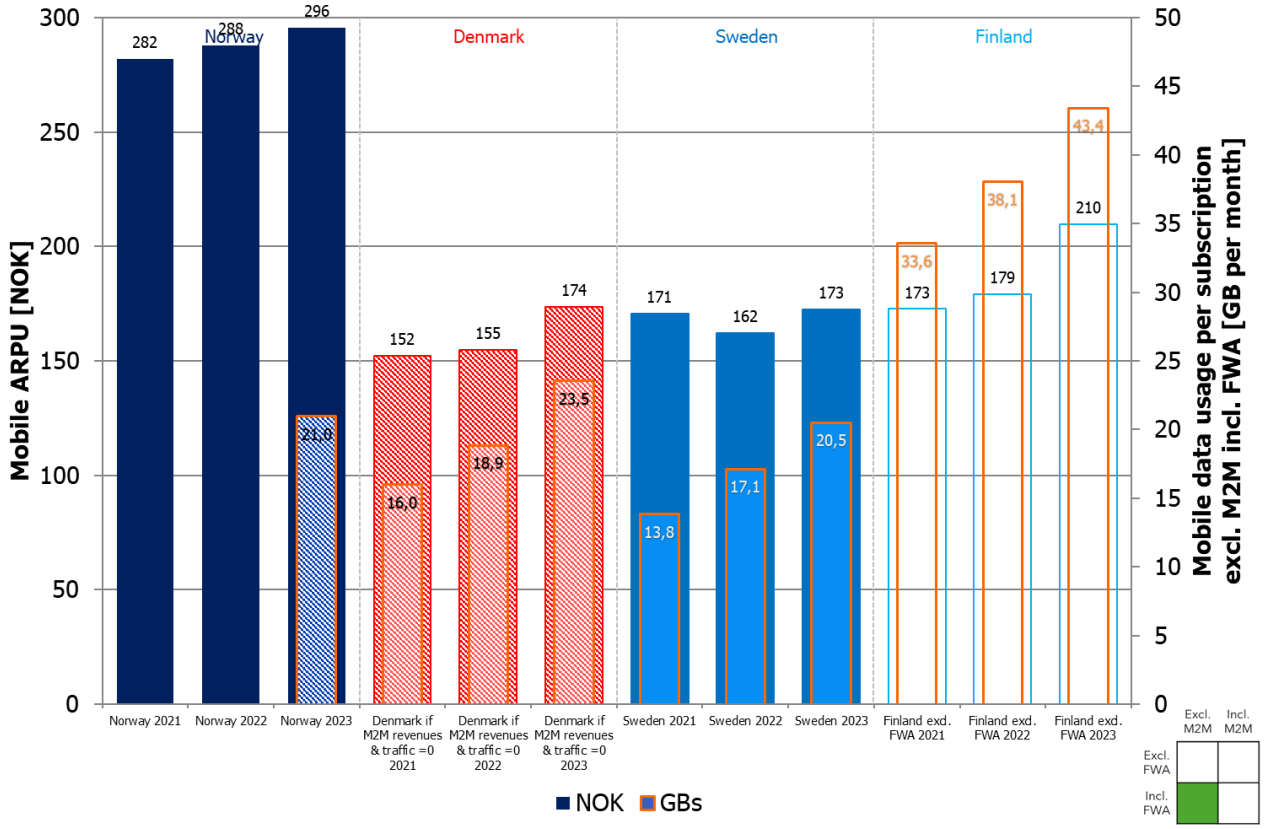

Figure 32. ARPU per mobile subscription excl. M2M incl. FWA vs. the average mobile data usage per subscription excl. M2M incl. FWA for Norway, Denmark, Sweden, and Finland 2021, 2022 and 2023. For definitions of indications and assumptions, see the respective ARPU and data usage charts [source: Nkom, SDFI, PTS, Traficom, operator reports for 2023 for Finland and Denmark as regulators have not yet reported revenue].

When excluding M2M, Norway's higher ARPU differential vs. Denmark and Sweden widens although the Norwegian estimated average mobile data usage is lower than Denmark's and just slightly higher than Sweden's.

The Norwegian ARPU is always higher than the ARPU of the other three countries – regardless of including or excluding M2M and regardless of including or excluding FWA.

The Norwegian data usage is always lower than in Finland and Denmark. The Norwegian data usage is lower than the Swedish in three out of four cases: When including FWA, but excluding M2M, the estimated Norwegian data usage is slightly higher than the Swedish.

The combination of highest ARPU and low data usage means that Norwegian mobile customers get less value for money than mobile customers in Denmark, Sweden, and Finland.

7 Mobile ARPU per reporting operator

Regulatory data has the benefit of being defined in the same way for all providers in a market but has the drawback of being relatively infrequently reported and published with a certain delay. Depending on regulator and type of data, it is not always possible to break it out per operator.

Figure 33 below shows the mobile ARPU as reported by the 14 MNOs in our four markets – converted into NOK.

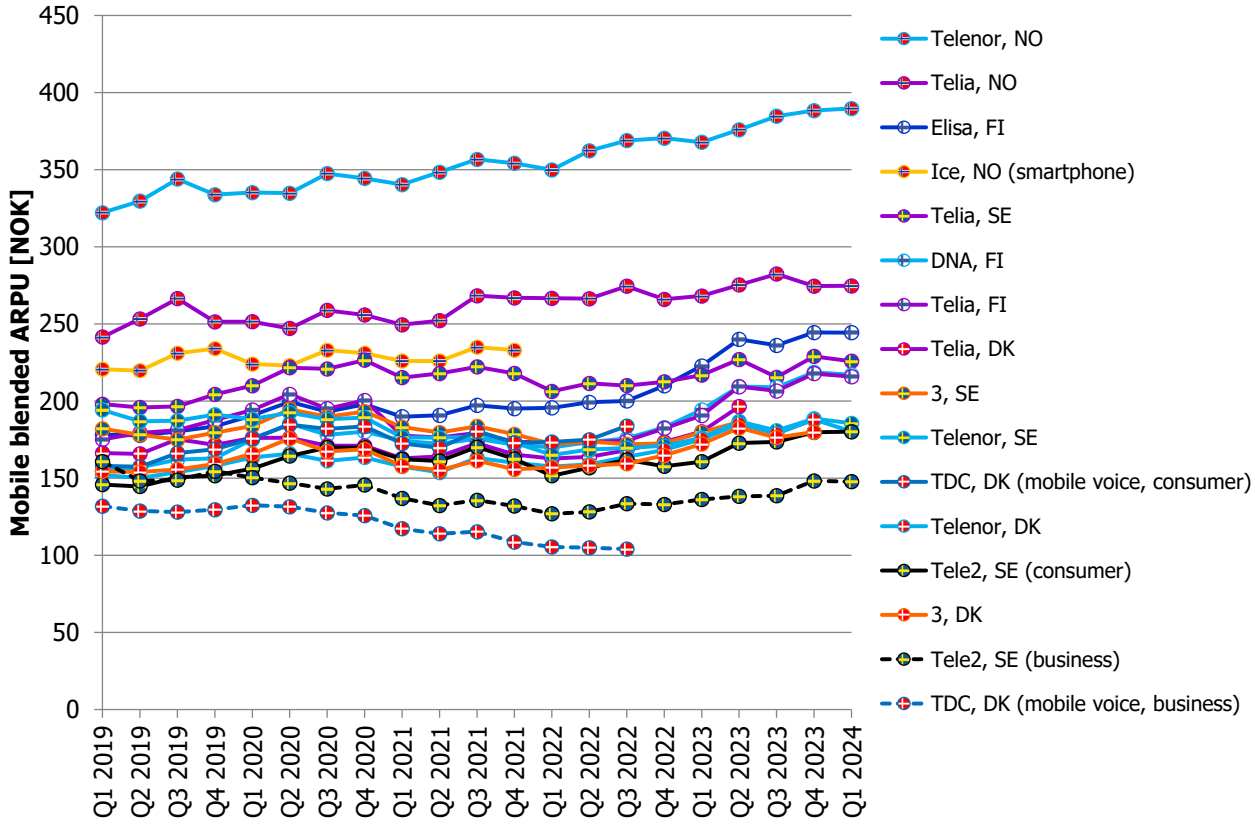

Figure 33. ARPU per mobile subscription excl. M2M for the 14 operators (MNOs) in Norway, Denmark, Sweden, and Finland from Q1 2019 to Q1 2024 [source: operator reports, compiled by Tefficient]. 3's ARPU is reported every six months, hence missing for Q1 2024. Tele2 doesn't report one blended ARPU number but split between consumer and business. Same for TDC which also excludes data-only subscriptions from its reported mobile voice ARPU. TDC has been split in Nuuday and TDC NET and Nuuday has not continued to report ARPU. Ice was acquired by Lyse in 2022 and Lyse has not continued to report ARPU for Ice.

The definitions of what is included in the reported mobile ARPU can differ somewhat between the operators, but as a rule, M2M is excluded. The graph shows the blended ARPU including both postpaid (contract) and prepaid subscriptions.

There's one operator with significantly higher ARPU: **Telenor Norway**. Its Q1 2024 ARPU of **390 NOK** is 42% higher than the operator with the second highest mobile ARPU, Telia Norway.

Danish and some Swedish operators are generally reporting the lowest ARPU levels. The weakening of the NOK vs. the EUR and the DKK in 2023 makes the ARPU growth in Finland and Denmark look stronger.

Applying purchasing power parity does not change the findings.

Telenor Norway has a uniquely high mobile ARPU – 42% higher than second ranked Telia Norway. Telia has much lower ARPU than Telenor but still higher than other operators in the Nordics.

8 Pricing comparison: Mobile data plans with unlimited voice and messaging

It is relatively straight-forward to compare advertised prices on mobile plans between operators and between markets, but we would like to warn against concluding solely based on such analysis as it's not representative for what mobile customers actually *pay*. It shows how much mobile customers *could pay*.

In the Nordics, only about 15-30% of mobile customers switch mobile provider during a year. 70-85% of mobile customers are not. Many of these are subscribing to mobile plans that are different compared to those that presently are marketed and sold. As there is price erosion[20] and data bucket inflation[21] in the Nordics, most customers that are on old plans **pay more for their usage than they could have** would they have been on a new plan.

Hence, we favour comparing the revenues derived from mobile users – as we just did when comparing ARPU – as opposed to comparing price points. But to balance this analysis, we have done an almost complete[22] market scan of the pricing of mobile contracts with unlimited voice and messaging in our four countries.

To differentiate, operators use e.g. different policies, service bundling tactics, inclusive services, family discounts, youth discounts and fixed-mobile bundling discounts. To make this comparison as like-for-like as possible, we have applied the following criteria:

- Only *consumer* prices considered – including VAT
- Only plans with *unlimited* voice and messaging and stipulated levels of EU roaming[23] considered
- Time limited discounts – like first three months for half price – *not* considered
- Age-based discounts *not* considered
- Fixed-mobile bundling discounts *not* considered
- Family discounts *not* considered
- Binding contracts – for example 24 months – *not* considered
- Premium plans that include content – for example with several streaming services for an additional fee – *not* considered unless the content part can't be deselected

Albeit having applied these definitions, there are still differences in how mobile data is offered in our four Nordic markets. We have found a total of **162 data phone plans** in Norway, Denmark, Sweden, and Finland.

Figure 34 shows that **Finland** is unique since only one bucket plan is offered. All remaining 17 plans in Finland are entirely unlimited in data volume. They are also speed-tiered, i.e. charged based on the maximum speed.

[20] When providers lower the price of a plan for new customers.
[21] When providers include more data volume for new customers without changing the price.
[22] All MNOs are covered if full. The most prominent sub-brands (if any) of each MNO are covered too. Larger MVNOs that are strong in data-rich plans are also covered. In previous editions, we limited our scan to plans with 30 GB data or more. There is no longer such a limitation – all data plans are covered if there is some mobile data in them.
[23] The data volume is typically following EU's stipulated minimum level defined by the total monthly price of a plan.

In **Norway**, the most common plan type (41 cases) is the traditional bucket plan with a limited amount of data to be used in a month[24]. But Norway has another frequent (17) plan type – the speed-tiered unlimited plan which is throttled in speed to just 3 Mbit/s once a full-speed bucket has been consumed. To slow the speed down after typically 100 GB in a month is a Norwegian speciality – such "limited unlimited" plans are not sold in Sweden, Finland, or Denmark. Unlike in the other three markets, there is yet no mobile plan in Norway which grants the customer an unlimited amount of *same speed* data.

There is also one plan in Norway – from Happybytes – that isn't part of a speed-tiered approach, but offered with *maximum* speed up to 108 GB – after which it is throttled to the same 3 Mbit/s. The plans we have classified as "Other" in Norway are the combination of Ice's regular bucket plans with an add-on called "Data Frihet". It allows for an additional 1000 GB of extra data in a month but throttled to maximum 25 Mbit/s from the first byte. The requirement is also that the extra data (up to 1000 GB) is consumed in Ice's own network and not through national roaming on Telia's network.

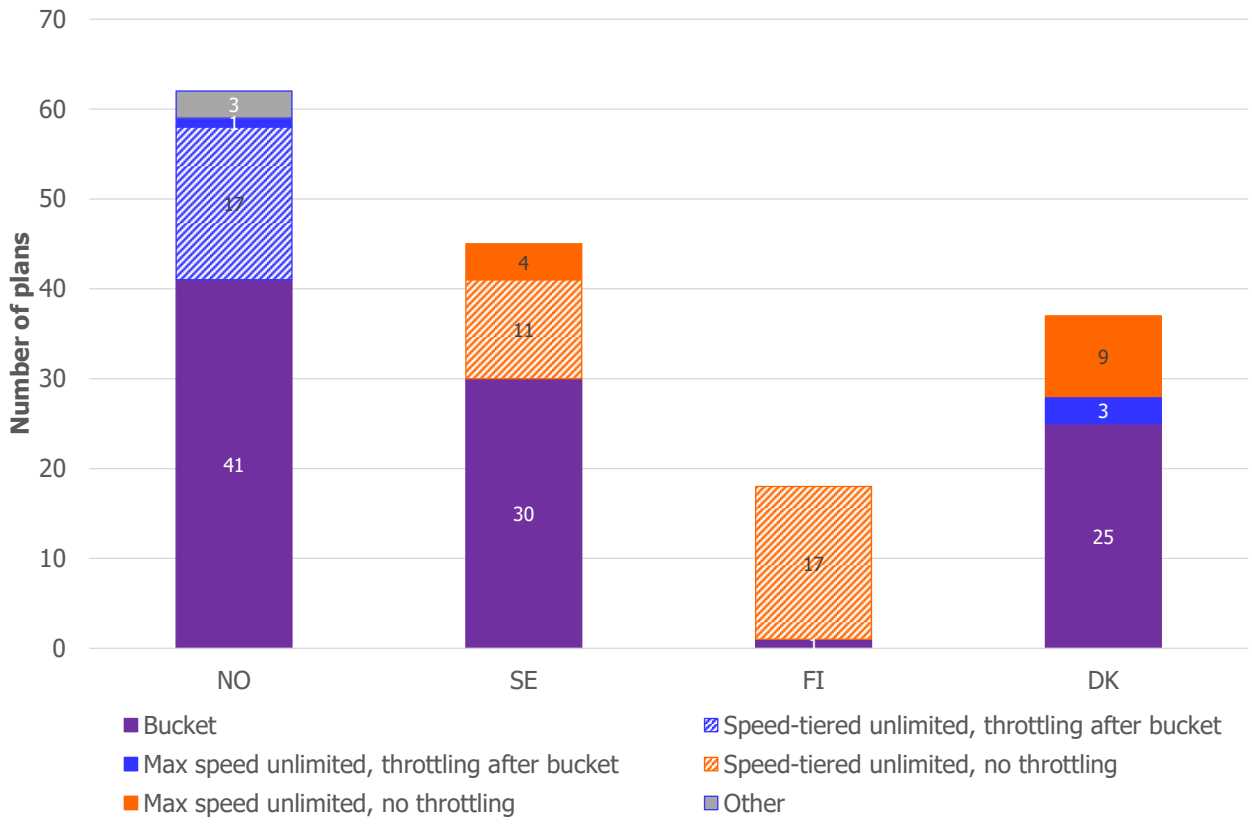

Figure 34. Comparison of the number and type of mobile data phone plans with unlimited voice & messaging across main MNO brands, most secondary MNO brands and a few selected MVNO brands in Norway, Denmark, Sweden, and Finland 6-7 June 2024 [source: Individual webpages of the mobile brands, compiled by Tefficient]

A majority of plans (30) are bucket plans also in **Sweden**. Telia, Tele2, and Chilimobil offer speed-tiered unlimited in Sweden – without any Norwegian-style throttling beyond a certain allotment. From a Norwegian perspective, it's interesting that Chilimobil has taken a different policy approach in Sweden than in Norway:

[24] Happybytes offers a 30 GB per month bucket plan and a 1 GB per *day* bucket plan in parallel. Also the latter has been included into our analysis with its theoretical maximum of 30 GB in a month of typical duration.

In Norway, Chilimobil (like others) throttles the speed to 3 Mbit/s after 100 GB per month, something it does not do in Sweden. 3 and Telenor offer unlimited without speed tiering in Sweden.

Bucket plans dominate (25) in **Denmark** too. When compared to the other three countries, Danish buckets are much larger.

Three plans from YouSee have been classified as "Max speed unlimited, throttling after bucket" although they are marketed as generic bucket plans. After 20, 40, or 80 GB respectively per month, transmission continues with 1 Mbit/s. This is the closest we get to 'the Norwegian model' in the other three markets. In addition, there are nine unlimited plans – all at maximum speed – which has no limit after which the speed is throttled. This means that Denmark is the only of these four markets without a speed-tiered option.

Having concluded the statistics on *how many* plans are offered per type per country, let's now compare the prices between them. Since the policy approaches, as shown, differ between the countries, we will have a pedagogical challenge in doing this. To highlight different angles, we will hence use **three different graphs** to compare the prices. Due to the fluctuation in Norwegian PPP from 2022 to 2023, the graphs are not shown in PPP versions.

First, in Figure 35, we compare the prices – in NOK – against the full speed data bucket per month. The largest bucket plan, from Oister in Denmark, has 500 GB per month. Plans with unlimited[25] full-speed mobile data allowance are shown at the ∞ symbol. Since the Norwegian providers all throttle the speed to 3 Mbit/s after 100/108 GB per month, the Norwegian unlimited plans are shown at 100/108 GB in *this* graph.

Trend lines are drawn for each country to assist the interpretation of differences in pricing between the countries.

[25] Unlimited means 1000 or 2000 GB per month with Danish operators and 1000 GB with Ice's Data Frihet. With most Swedish operators, the user will have to reply to an SMS after having used a certain amount of data in a day (in Tele2's case e.g. 50 GB to continue to use data in 5 GB allotments which each calls for a new SMS).

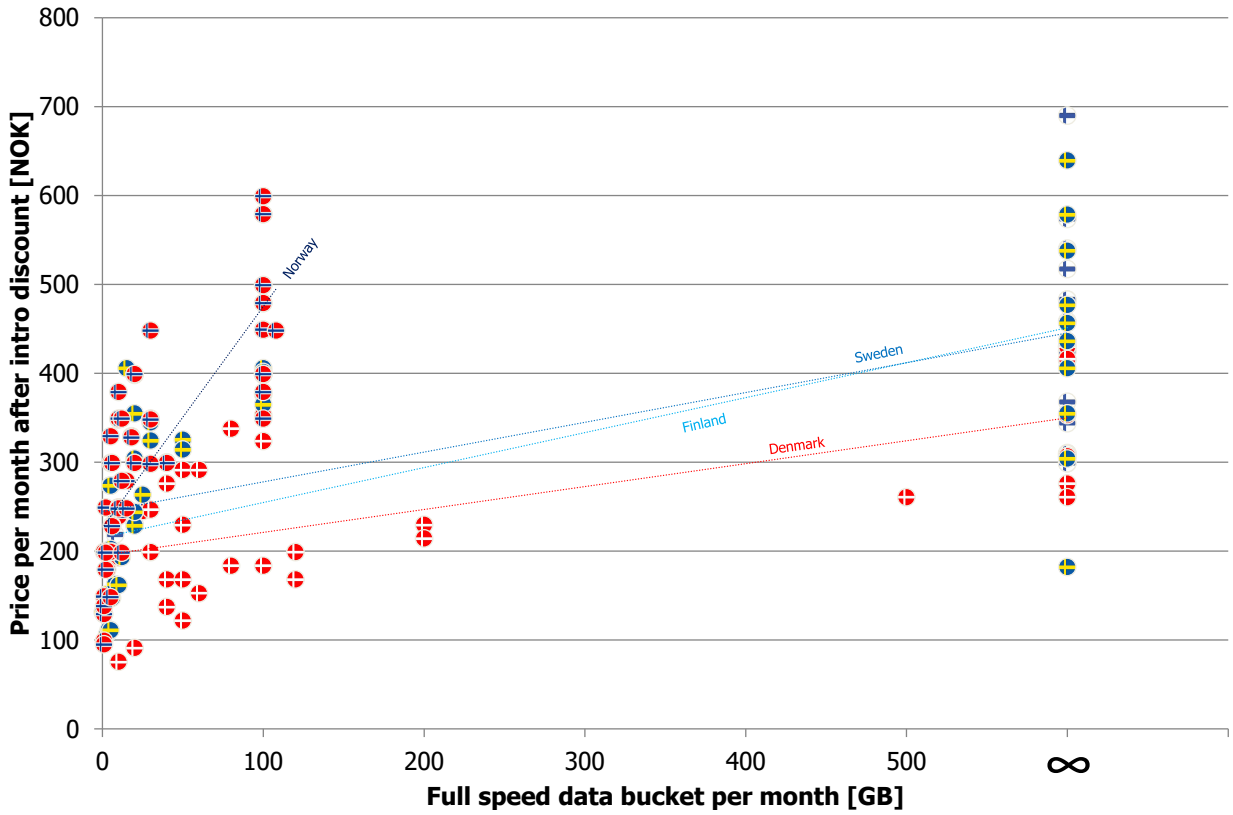

Figure 35. Comparison of the pricing of mobile data phone plans with unlimited voice & messaging across main MNO brands, most secondary MNO brands and a few selected MVNO brands in Norway, Denmark, Sweden, and Finland 6-7 June 2024 against the full speed data bucket per month [source: Individual webpages of the mobile brands, compiled by Tefficient]

With this visualisation, **Norway generally has the highest prices**. The Norwegian trend line is also very steep, indicating that plans with more data carries a higher price premium in Norway than elsewhere. The trend lines of Finland and Sweden are close to each other whereas **Denmark generally has the lowest prices**.

As identified, the throttling-beyond-a-bucket policy for unlimited is unique for Norway and the visualisation in Figure 35 could be seen as too strict on Norway: A Norwegian unlimited plan that is throttled to 3 Mbit/s after 100 GB is here compared to a Danish or Swedish bucket plan with 100 GB and no continuation beyond 100 GB. Having established (Figure 18) that the average non-M2M non-FWA subscription in Norway used 11.3 GB per month in 2023, most users would never experience the speed degradation – that only starts past 100 GB.

And since most customers won't experience it, one could turn a blind eye to this difference in policy. To do that, we have in Figure 36 grouped all plans with *100 GB or more* to the right in the graph.

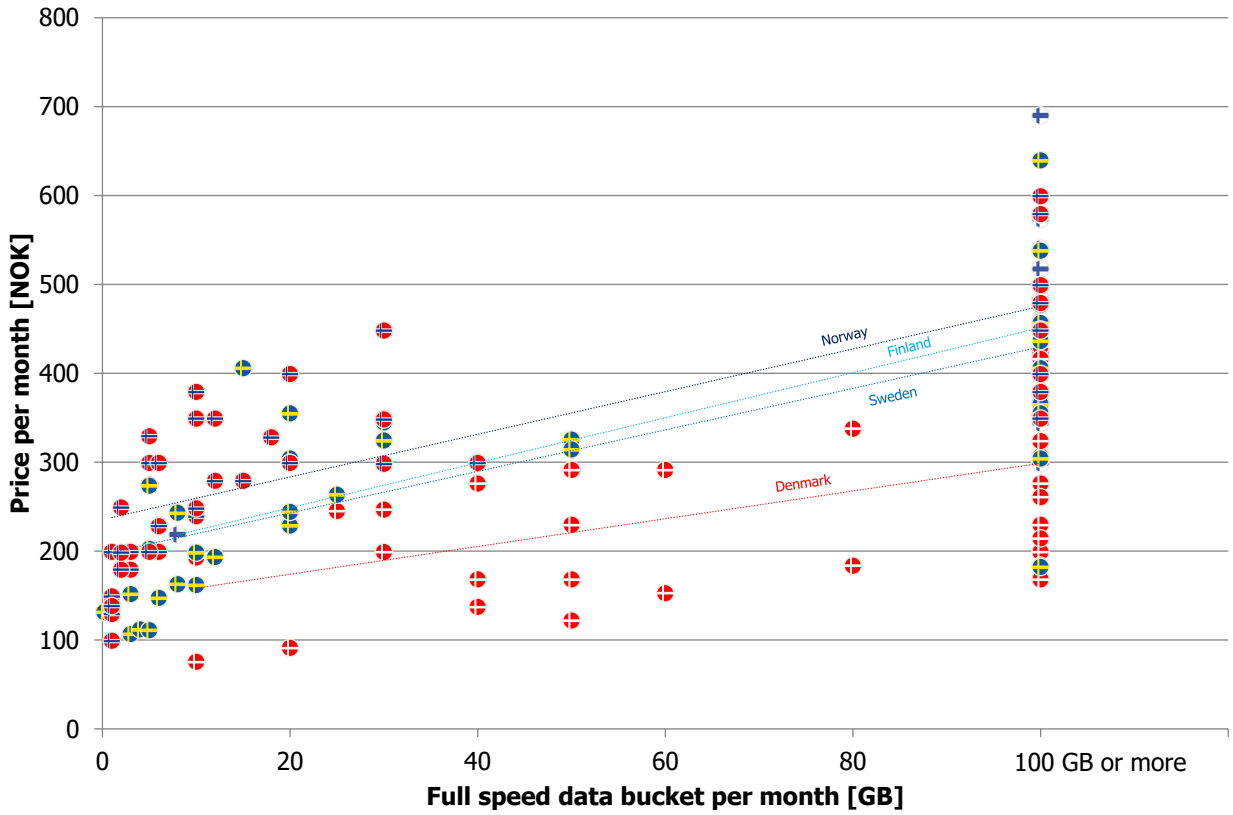

Figure 36. Comparison of the pricing of mobile data phone plans with unlimited voice & messaging across main MNO brands, most secondary MNO brands and a few selected MVNO brands in Norway, Denmark, Sweden, and Finland 6-7 June 2024 against the full speed data bucket per month [source: Individual webpages of the mobile brands, compiled by Tefficient]

With this visualisation, the "100 GB or more" category becomes cluttered. Comparing the trend lines, **Norway is in this visualisation not much more expensive than Finland or Sweden** (about 30-50 NOK per month) whereas Denmark still generally provides the cheapest options across the four markets. The cheapest plan is also Danish – from 3's sub-brand Flexii: 10 GB for 76 NOK.

Cheapest in the "100 GB or more" category is a 120 GB plan from Oister in Denmark for 168 NOK.

Our last pricing comparison graph addresses the **differences in the maximum download speed** – which is important now that mobile providers in Norway, Sweden and Finland often use the maximum download speed as the only parameter defining price. Plans without an unlimited data volume, i.e. bucket plans, are not in Figure 37 as there is no speed differentiation on bucket plans.

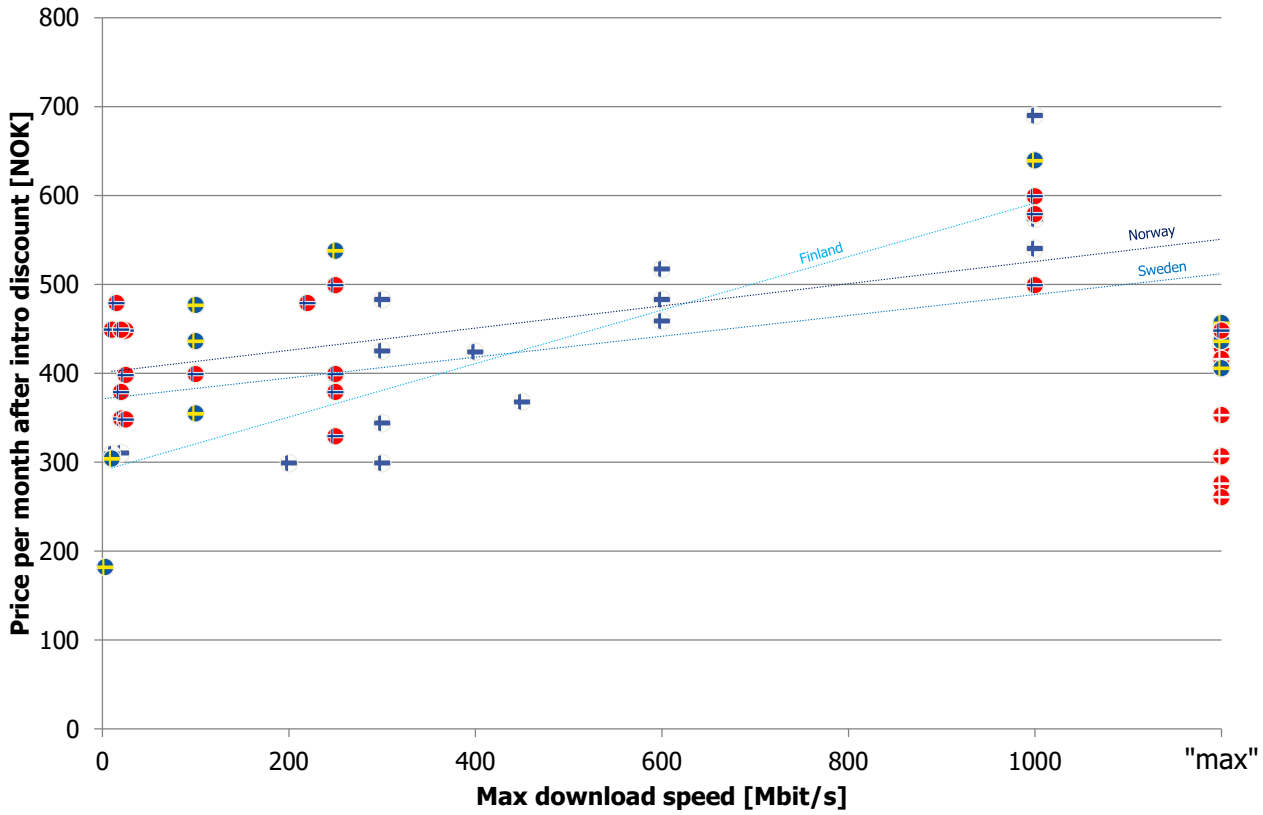

Figure 37. Comparison of the pricing of mobile data phone plans with unlimited voice & messaging across main MNO brands, most secondary MNO brands and a few selected MVNO brands in Norway, Denmark, Sweden, and Finland 6-7 June 2024 against the maximum download speed [source: Individual webpages of the mobile brands, compiled by Tefficient]

The "max" category collects the offers where the mobile provider hasn't stated the maximum download speed, but just said that it will be always the highest available. It could be argued that this "max" speed not necessarily will be higher than with a communicated maximum of 1000 Mbit/s, but we have anyhow visualised it to the right of the graph as the mobile provider does not apply any throttling of the max speed and that it therefore, at least in theory, can be higher.

In this third graph, we will not have a trend line for Denmark since there's no speed-tiering in Denmark. All Danish dots are "max" dots.

If comparing the trend lines, **Norway comes across as the most expensive market in the slower speed range** whereas Finland comes across as the most expensive in the 1000 Mbit/s speed. The trend line is steeper in Finland than in Norway and Sweden, i.e. higher speed costs relatively more in Finland.

The trend lines of Sweden and Norway are quite parallel, i.e. if considering the maximum download speed only (in Norway's case up to 100/108 GB), the Norwegian unlimited mobile plans are generally more expensive than the Swedish.

Albeit without a trend line (due to no speed-tiering), Denmark is once again seen as the most affordable market.

Since the scope of our price scan has been widened in this year's edition of the analysis, we can't make trend observations. Having said that, inflation has been high in 2023, and mobile providers have generally increased prices, but there are exceptions in all markets.

The weakening of the Norwegian krone vs. the Euro and the Danish krone in 2023 has contributed to closing some of the gap to Finland and Denmark.

Norwegian plans can't yet fully compete on price with Danish, Swedish and Finnish plans. If not considering the Norwegian policy to throttle unlimited plans after 100 GB, the gap to Finland and Sweden is not substantial, though – about 30-50 NOK per month.

Danish mobile providers are offering the most affordable plans in the Nordics.

We however started this section warning against concluding solely based on current pricing. Few customers are today on the plans currently offered. The ARPU is representative of what mobile customers actually *pay* and should be given more weight in a balanced conclusion, see section 13.

9 EBITDA margin per reporting operator

In sections 5, 6 and 7, we concluded that Norwegian operators generally enjoy high ARPU although mobile data usage is low. Does this trickle down to high profitability too?

First, we will look at what remains of revenue after having paid recurring OPEX: The adjusted EBITDA (earnings before interest, tax, depreciation, and amortisation). The adjusted EBITDA margins of the integrated operations of the major operators in Norway, Denmark, Sweden, and Finland are shown in Figure 38.

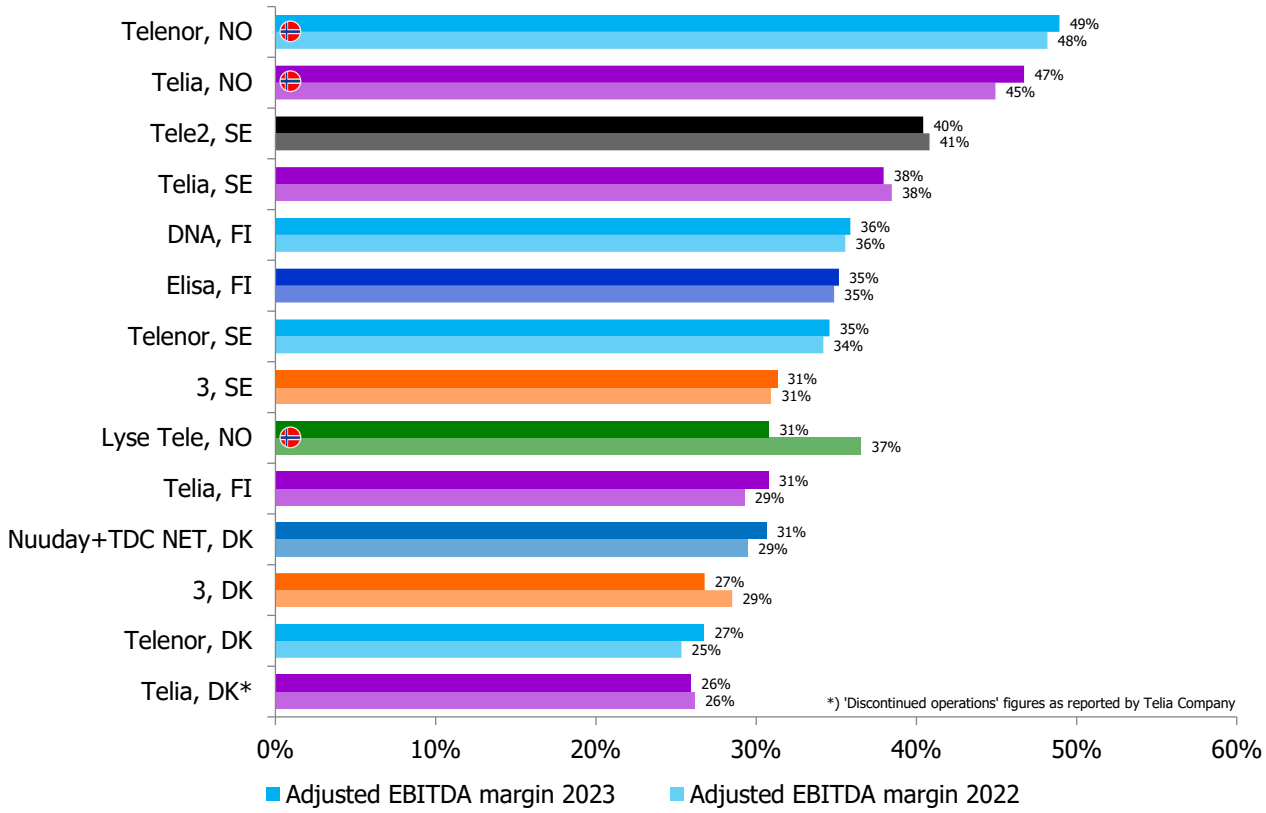

Figure 38. Adjusted EBITDA margin for the integrated operations of the major operators in Norway, Denmark, Sweden, and Finland 2022 and 2023. Note that operators report their EBITDA for their complete business which most often is wider than just mobile; two operators are pure mobile: 3 Sweden and 3 Denmark. Nuuday and TDC NET are today two separate companies under the same ownership, but to make it comparable with other operators, their figures have been summed up [source: operator reports, compiled by Tefficient]

The two established Norwegian operators, **Telenor** and **Telia**, have the highest adjusted EBITDA margins in these four countries. This is true both for 2022 and 2023. The adjusted EBITDA margins of Telenor and Telia increased in 2023.

Lower down in the chart, we identify **Lyse Tele** that acquired and incorporated **Ice** by 30 March 2022. The EBITDA margin of Lyse Tele was 31% in 2023 which is lower than Telenor and Telia. The margin fell significantly in 2023, mainly explained by Ice not being part of Lyse for the whole year of 2022.

Telenor Norway and Telia Norway having the strongest adjusted EBITDA margins is an indication of:

1) That their revenue is unusually high, or

2) That their OPEX is unusually low, or

3) Both

Neither Telenor Norway nor Telia Norway has a problem with high OPEX in their integrated business. If so, their EBITDA margins wouldn't be best in class and improving. Lyse Tele has a lower EBITDA margin, close to the Nordic median if excluding Telenor Norway and Telia Norway.

10 EBITDA-CAPEX (cash flow approximation) margin per reporting operator

There are other costs than OPEX, though. We also need to take CAPEX into account. Figure 39 compares the CAPEX to revenue ratios for our operators. In 2023, **Lyse Tele** was the operator that invested the most in CAPEX given the revenues it had – 33%.

TDC in Denmark is today split between the "ServCo" Nuuday and the "NetCo" TDC NET but we have here summed them up to be able to compare it with the other operators. Nuuday+TDC NET used 20% of its revenues on CAPEX in 2023.

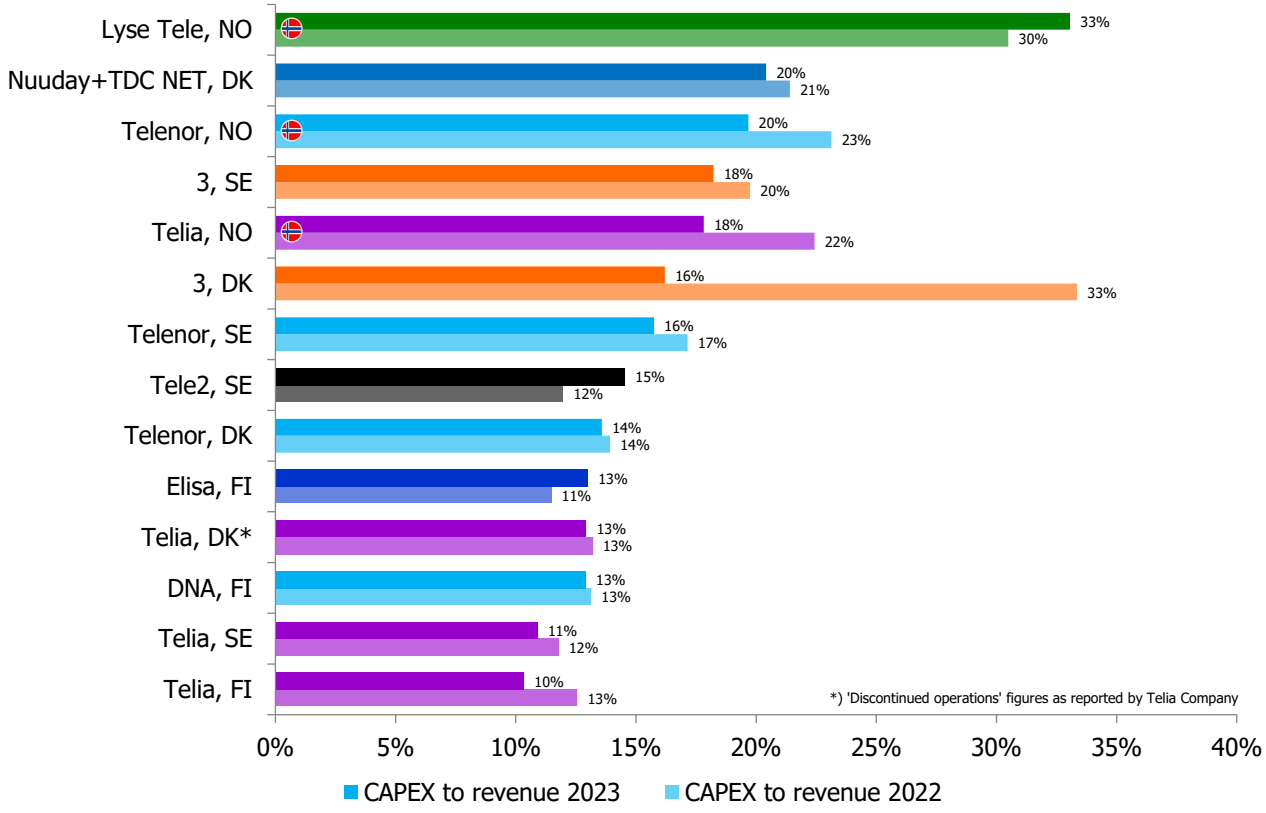

Figure 39. CAPEX to revenue for the integrated operations of the major operators in Norway, Denmark, Sweden, and Finland. Note that operators report their CAPEX for their complete business which most often is wider than just mobile; two operators are pure mobile: 3 Sweden and 3 Denmark. Nuuday and TDC NET are today two separate companies under the same ownership, but to make it comparable with other operators, their figures have been summed up [source: operator reports, compiled by Tefficient]

Third-ranked **Telenor** Norway also invested 20% of its 2023 revenues. **Telia** Norway is as well investing a bit more than what is common in the Nordics; 18% of revenues in 2023. Most of the Norwegian investments are in fixed and fibre (63%) rather than in mobile networks (32%)[26]. But since all Norwegian operators end up in the upper part of the chart, there's merit in the claim that **Norwegian operators invest more**.

[26] Based on 2023 statistics from Nkom. The remaining 5% is other investments.

Norwegian operators all invest more – as share of total revenue – than the median Nordic operator.

Does the generally high CAPEX in Norway then negatively influence the cash flow of the operators? Here we make an approximation when subtracting the CAPEX from the EBITDA and calling it the cash flow. It shows what remains of revenue after having paid recurring OPEX and CAPEX.

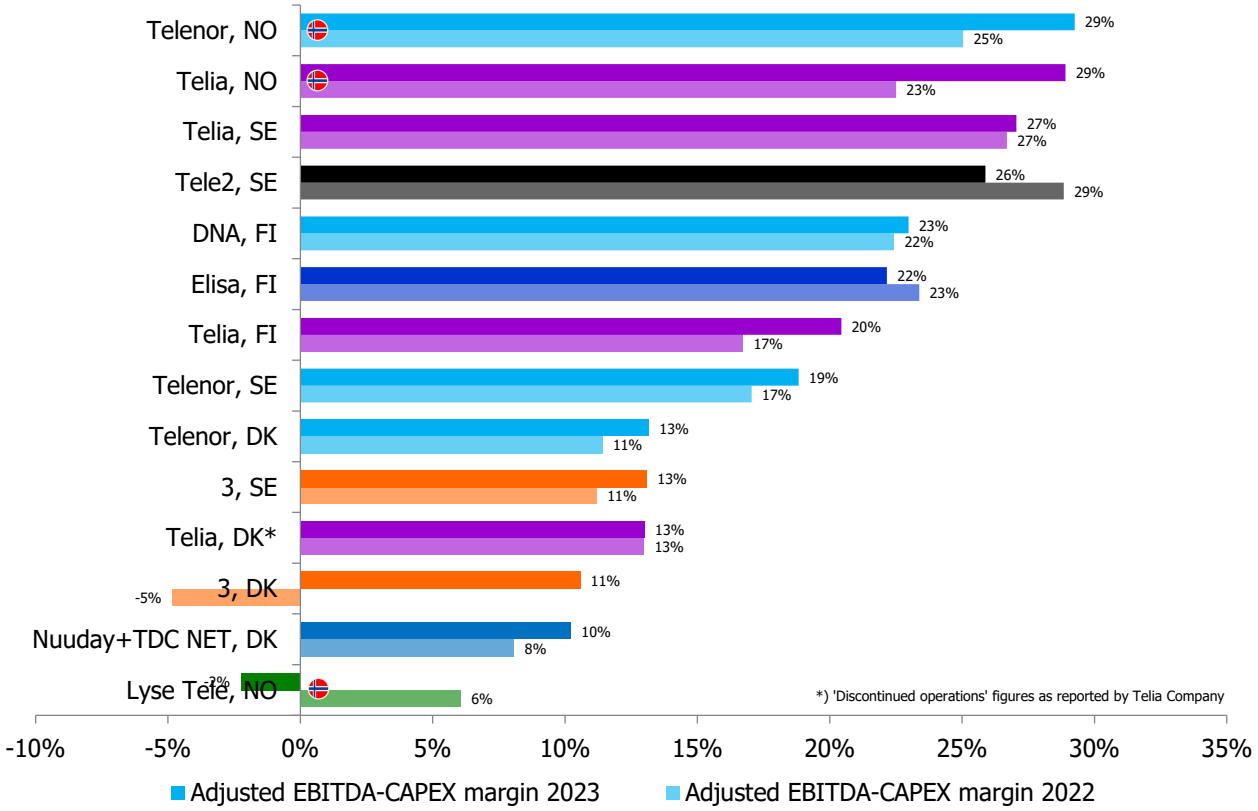

Figure 40. Adjusted EBITDA-CAPEX margin for the integrated operations of the major operators in Norway, Denmark, Sweden, and Finland. Note that operators report their EBITDA and CAPEX for their complete business which most often is wider than just mobile; two operators are pure mobile: 3 Sweden and 3 Denmark. Nuuday and TDC NET are today two separate companies under the same ownership, but to make it comparable with other operators, their figures have been summed up [source: operator reports, compiled by Tefficient]

At the top of the graph, we again find **Telenor** Norway and **Telia** Norway. So, although they both spend more of their revenue in CAPEX than the median Nordic operator, their leading EBITDA margin is so high that it returns the highest EBITDA-CAPEX margin. Thanks to the improvement in the EBITDA margin from 2022 to 2023 and the reduction in CAPEX to revenue from 2022 to 2023, both Telenor Norway and Telia Norway have had significant improvements in their EBITDA-CAPEX margins in 2023.

At the other end of the chart, we find **Lyse Tele**. Although its EBITDA margin isn't bad, its very high CAPEX to revenue makes EBITDA-CAPEX negative in 2023. Lyse Tele has invested more in CAPEX in 2023 than its business generated in EBITDA.

Neither Telenor Norway nor Telia Norway has a problem with high OPEX+CAPEX. If so, their EBITDA-CAPEX margins wouldn't be the highest in the Nordics. The situation for Lyse Tele is different: In 2023, Lyse Tele could not cover its CAPEX with its EBITDA.

11 Market concentration and HHI per country

As shown in section 7, Telenor Norway's reported mobile ARPU is uniquely high not just in a Nordic perspective, but in Norway. This, together with a leading market share in subscriptions, results in a solid market share in revenue, see Figure 41. It shows the distribution of mobile service revenue in Norway between the three MNOs Telenor, Telia and Ice – and other (non-MNO) providers.

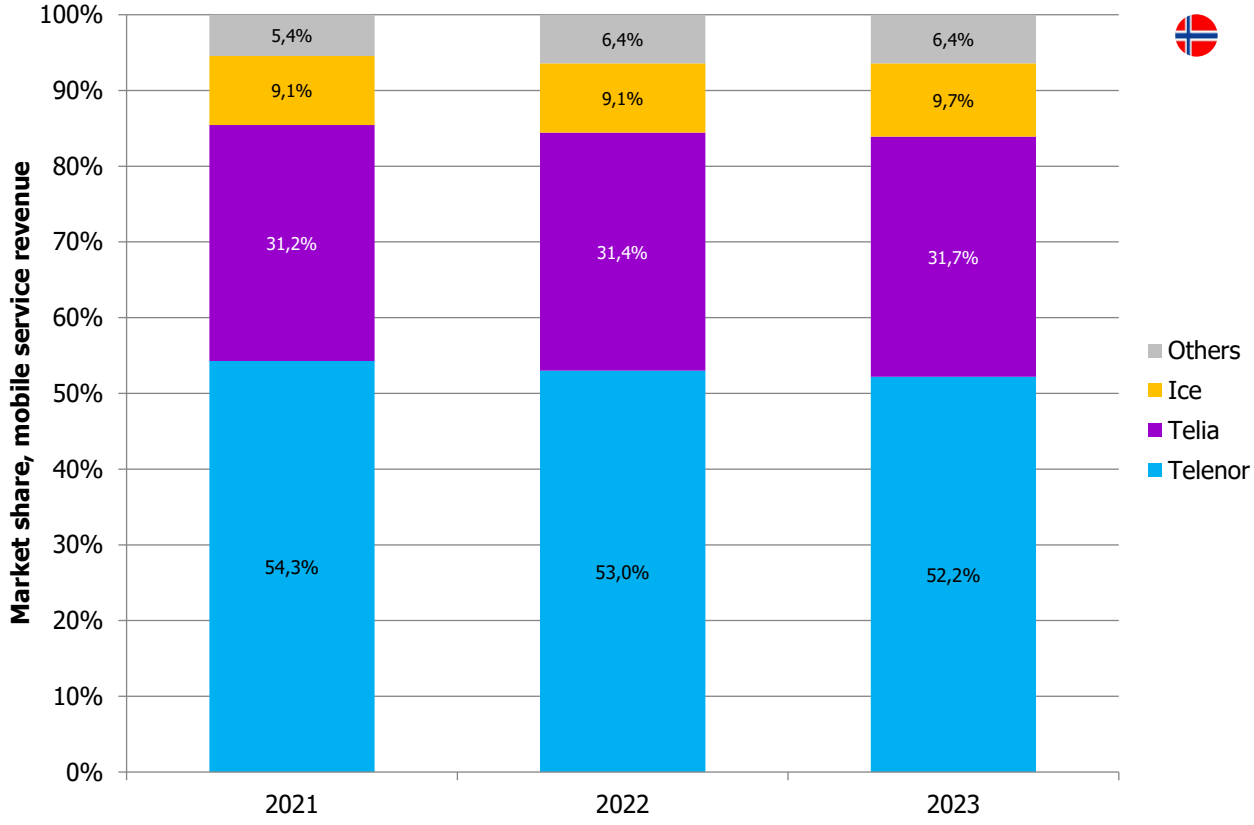

Figure 41. Market share in mobile service revenue, Norway [source: Nkom]

Although Telenor's mobile service revenue market share is leading, **52.2%** in 2023, it has declined compared to 2021 and to 2022. Telia, Ice and 'Others' have taken market share from Telenor.

Denmark's mobile service revenue distribution is shown below.

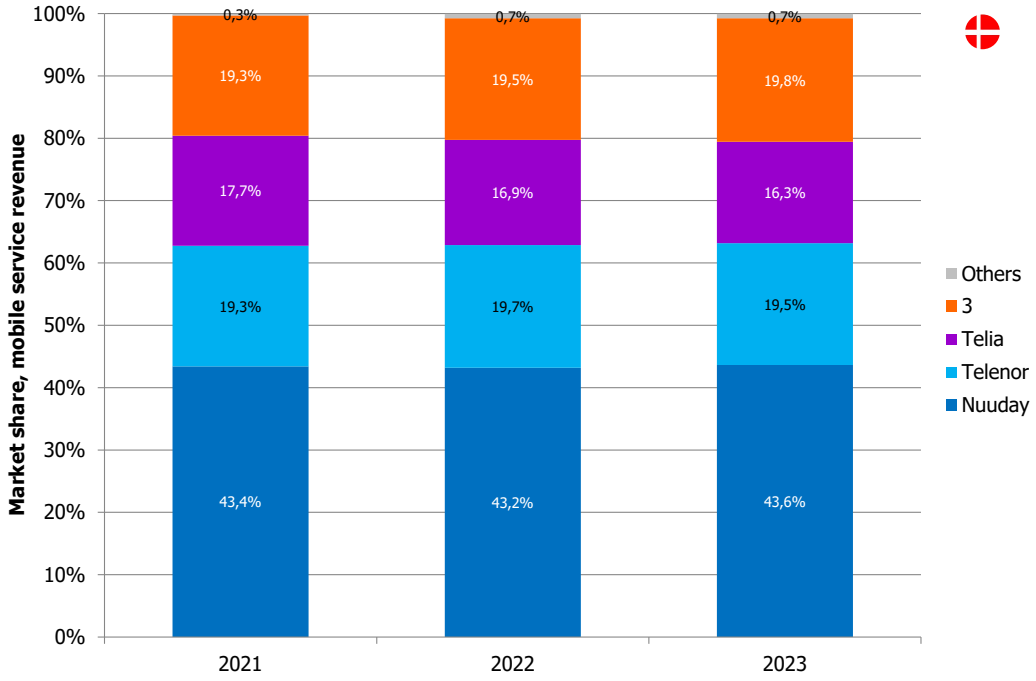

Figure 42. Market share in mobile service revenue, Denmark [source: Operator reports for 2021, 2022 and 2023 as SDFI does not break down revenue per operator; 'Others' revenue assumed being 88 MDKK which is the 2022 residual after having deducted the sum of the revenues of the four mobile operators from SDFI's reported market total. Telia has not reported 2H 2023; here assumed equal to 1H]

Denmark has four mobile network operators (MNOs) and the incumbent operator Nuuday (former TDC) has a more limited market share than in Norway: **43.6%** in 2023. The graph for Sweden follows below.

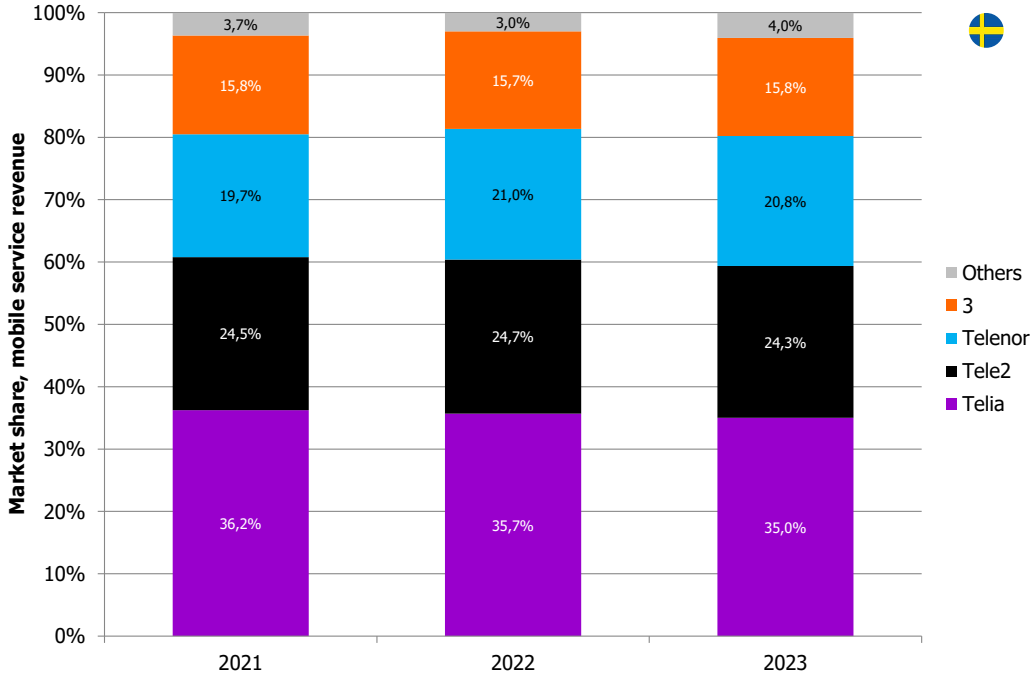

Figure 43. Market share in mobile service revenue, Sweden [source: PTS]

The incumbent in Sweden, Telia, had a **35.0%** revenue market share in 2023. Like Denmark, Sweden is a four MNO market.

Finally, the graph for Finland:

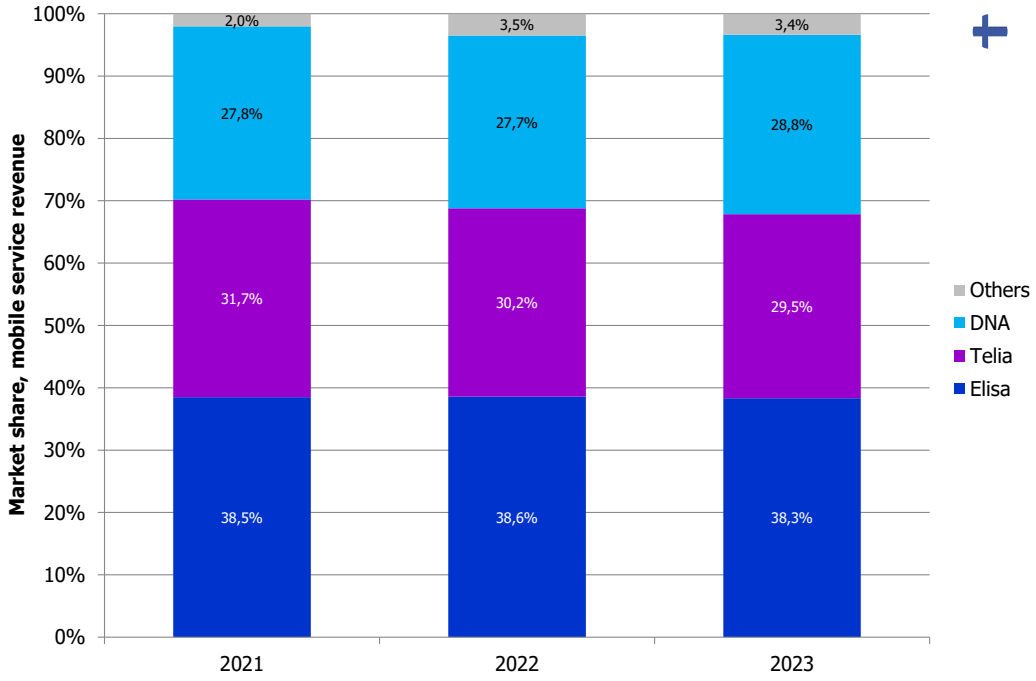

Figure 44. Market share in mobile service revenue, Finland [source: Traficom for 2021 and 2022 – for 2023 operator reports as Traficom hasn't yet reported revenues for 2023. 'Others' revenue in 2023 assumed to be unchanged vs. 2022]

The largest operator in Finland[27], Elisa, had a **38.3%** market share in 2023.

The table below summarises the market shares of the incumbent in each other markets – and calculates the concentration index HHI for the individual mobile markets.

What is HHI?

The Herfindahl-Hirschman Index is a simple and widely applied economic concept that often is used in regulation and antitrust matters. It is defined as the sum of the squares of the market shares of the companies competing in a market. A monopoly would thus get an index of $100^2 = 10000$ which is the maximum value and depicts a fully concentrated market.

Where the line should be drawn between a moderately concentrated and a highly concentrated market is obviously debatable but the U.S. Department of Justice has in its merger guidelines stated that a HHI value above 2500 should be considered highly concentrated.

The mobile business, with its limited number of licences, is often having higher HHI values than 2500, though.

[27] Elisa here assumed as the Finnish incumbent as it had the largest revenue market share in 2023. Unlike the other markets, Finland has not had a nationwide incumbent as the fixed networks rather were local monopolies.

	Revenue market share of incumbent MNO 2023	Herfindahl-Hirschman Index (HHI) 2023 [0-10000][28]
Norway (3 MNOs)	52.2%	3865 (-57)
Denmark (4 MNOs)	43.6%	2944 (+26)
Sweden (4 MNOs)	35.0%	2518 (-60)
Finland (3 MNOs)	38.3%	3179 (-2)

Figure 45. Comparison of incumbent market shares in mobile service revenue, Norway, Denmark, Sweden, and Finland – as well as HHI for the whole mobile market, 2023 (change from 2022 within parentheses) [source: Nkom, SDFI/operators, PTS, Traficom/operators, compiled by Tefficient]

The Norwegian mobile market is **uniquely concentrated**. This is true both when comparing the revenue market share of the incumbent as well as when comparing the HHI. The HHI has though decreased 57 points since 2022.

The fact that Norway only has three MNOs isn't the sole explanation to this; Finland too has three MNOs and although the Finnish HHI is higher than in Denmark and Sweden, its much lower than in Norway. When looking at the revenue market share of the largest operator in Finland, Elisa, it had 38.3% in 2023, a number in between the incumbents of the two four-MNO markets Denmark (43.6%) and Sweden (35.0%).

Telenor's contribution to the HHT of Norway is **71%** (2725 of 3865 HHI points). In comparison, Nuuday's contribution to the Danish HHI is 65%, Telia's is 49% to the Swedish HHI and Elisa's is 46% to the Finnish HHI.

The Norwegian mobile market is uniquely concentrated. It is not just explained by the number of MNOs. Telenor's revenue market share explains 71% of Norway's HHI. Norway is slowly moving towards a lower concentration, though.

[28] 'Others' is treated as one which increases HHI a bit in all markets

12 Quality for money: Comparison of the mobile network experience

We have seen that Norwegian operators enjoy high revenue although the data usage is low – and that Telia and Telenor have the highest cash flow margins albeit having invested more than what's typical. Does this result in a great mobile network experience that would contribute to the perception of value for money?

If we start with data from the crowdsourcing company **Ookla Speedtest**, we can see that the Norwegian networks lately have delivered median download speeds that are as fast as in Denmark and about 30-40 Mbit/s faster than in Sweden and Finland. Norway is the country in the world with the **fifth highest** median download speed[29] in May 2024, with Denmark as number 4. Finland is number 14 and Sweden number 20 (of 147 countries).

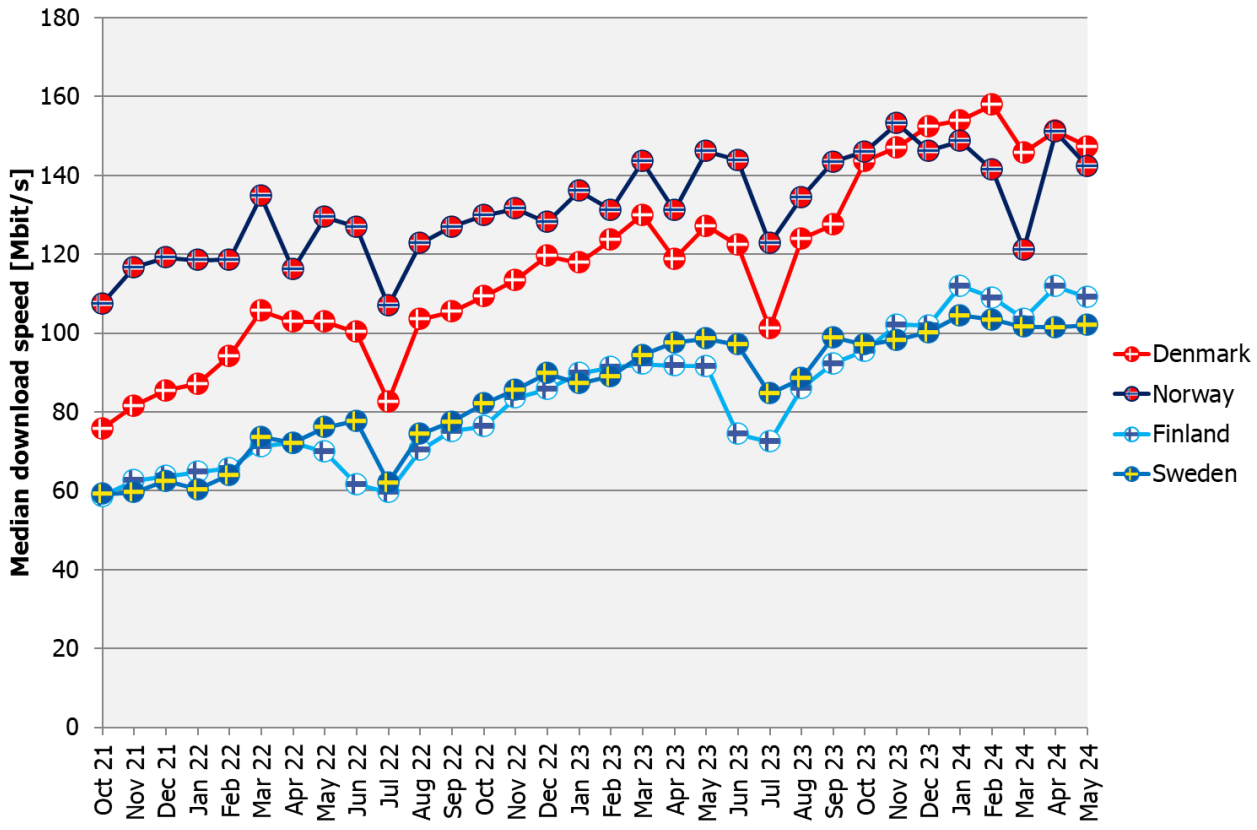

Figure 46. Median mobile broadband download speed for Norway, Denmark, Sweden and Finland per month Oct 2021-May 2024 [source: Ookla Speedtest]

When interpreting Figure 46, it's important to remember that 85% of non-M2M subscriptions in Finland were **unlimited and charged based on speed tiers**[30] in December 2023. The average Finnish mobile speed can therefore be curbed by customers not willing to pay more for speed. Similar statistics aren't available for

[29] https://www.speedtest.net/global-index

[30] The Norwegian mobile providers have introduced a similar speed-tiered approach starting in June 2020. Also a few Swedish providers have followed. Unlike in Finland, these are though offered as options to traditional bucket plans whereas Finnish operators only offer speed-tiered unlimited plans.

the other market, but the share of unlimited mobile subscriptions is estimated to be much lower (high single or low double-digit figures) in Norway, Sweden, and Denmark.

As shown in the table in section 3, Danish and Finnish operators have generally come the furthest with its **5G** rollout. Norway is approaching the same level whereas Sweden is still behind. As 5G speeds always cost extra in Finland, customers need to be convinced to pay more – for a new device, but *also* for a new subscription. The 5G introductions in Norway, Denmark and Sweden have more often been done so that existing customers *automatically* get access to 5G; the only thing they need is a new device.

Another important point to make is that mobile networks **share the existing capacity** between the users of a cell. If there is much demand for data, the speed per user will be slower. If there is little demand, the speed per user will be higher. Operators can improve the user experience by adding more capacity.

Since Norway has the lowest mobile data usage in the Nordics[31], the average speeds will be higher – if the capacity is the same – than in the other three markets. It is a bit easier for Norwegian operators to win a speed award because of the lower mobile data usage. On top of this, Norwegian operators could of course have deployed more capacity[32] – but that can't be assessed based on crowdsourced network performance tests.

Other crowdsourced tests take other factors than just speed into account. **Opensignal** has defined what they call *consistent quality* as:

- >5 Mbit/s download throughput
- >1.5 Mbit/s upload throughput
- <50 ms latency
- <30 ms jitter
- <1% packet loss

Based on that, Opensignal has ranked operators from around the world[33]. In the graph below, we show the top 17 operators of the world.

[31] True for all cases except the excl. M2M, incl. FWA case vs. Sweden.
[32] The higher CAPEX to revenue ratio of Norwegian operators suggests that.
[33] https://www.opensignal.com/reports/2024/02/global-mobile-network-experience-awards

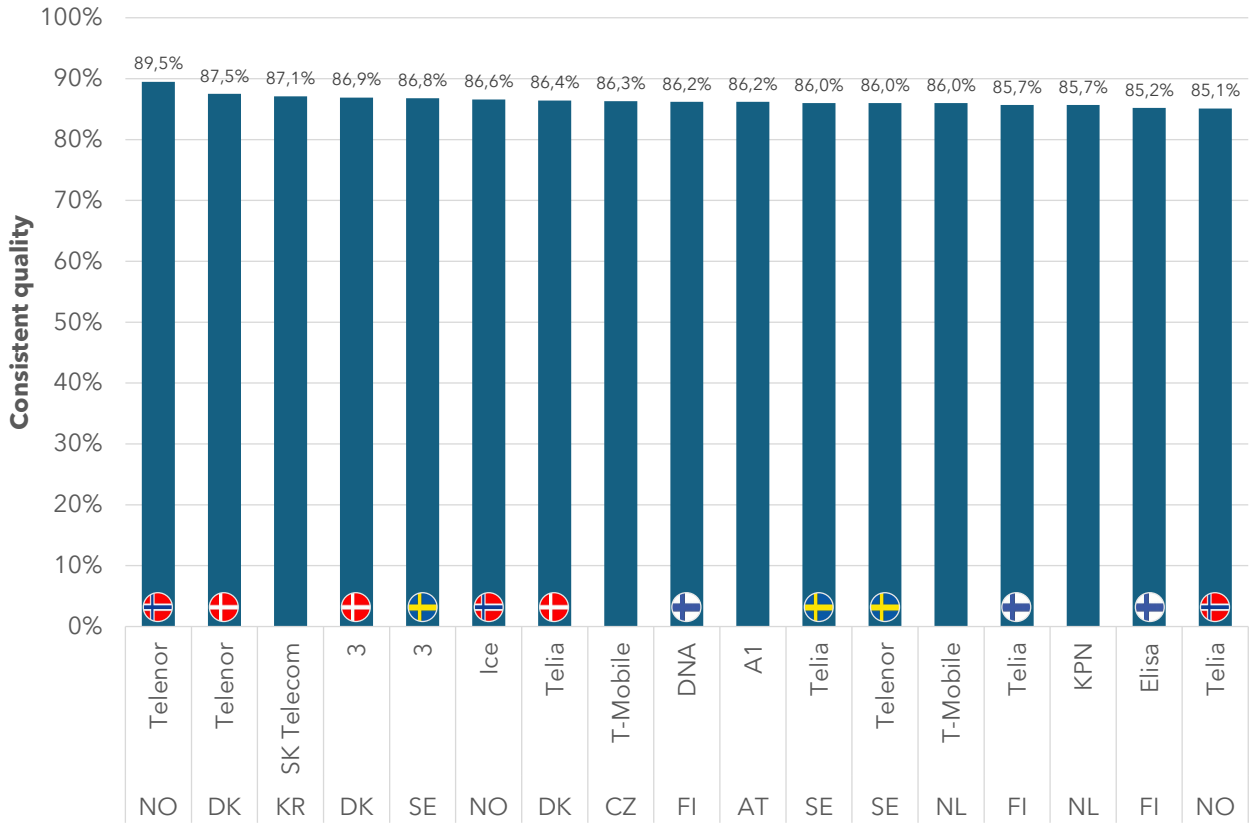

Figure 47. Top operators with regards to Consistent quality percentage July-Dec 2023 [source: Opensignal, compiled by Tefficient].

Twelve of the fourteen mobile network operators in Norway, Denmark, Sweden, and Finland are on this global top list[34]. It's fair to say that Nordic operators dominate the whole top list.

Norway: Number 1, 6 and 17

Denmark: Number 2, 4 and 7 (with TDC further down)

Sweden: Number 5, 11 and 12 (with Tele2 further down)

Finland: Number 9, 14 and 16

Whereas it's easy to state that Nordic operators deliver world-leading consistent quality, it's more difficult to highlight any of the countries as better than the other three. Among the Norwegian operators, Telenor stands out positively in consistent quality.

Let's again turn to Opensignal. It has issued Mobile Network Experience reports for Norway[35], Sweden and Finland in December 2023 with Denmark added in February 2024. To complement the just-covered "consistent quality" measure – which covers all network generations including 4G and 5G – we have put two

[34] All but TDC Denmark (84.3%) and Tele2 Sweden (82.7%). Since these two operators are positioned so much behind the other Nordic operators, it would call for a large number of non-Nordic operators to be added to the chart making it difficult to read.
[35] https://www.opensignal.com/reports/2023/12/norway/mobile-network-experience

of their key **5G specific** metrics in one chart that allows a direct comparison between the countries, see Figure 48.

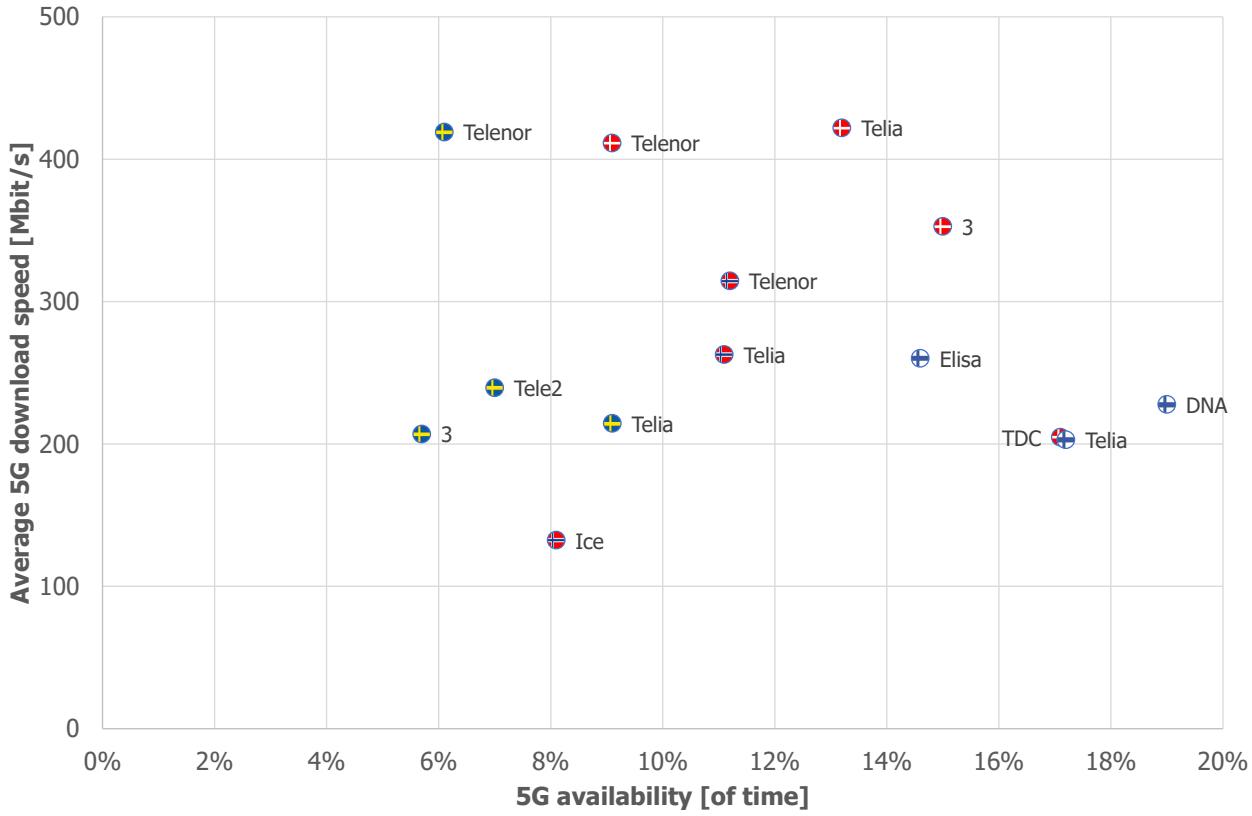

Figure 48. Average 5G download speed vs. 5G availability, Aug-Oct 2023 for Norway, Sweden and Finland, Oct-Dec 2023 for Denmark [source: Opensignal, compiled by Tefficient]

In a matrix chart like this, you would ideally like to be in the upper right corner where the 5G download speed is high and the 5G availability also is high.

The three Finnish operators are well positioned, especially on 5G availability. The Danish operators are well positioned too, especially on speed. The Swedish operators are low in 5G availability – a reflection of the lag in 5G rollout that Sweden has compared to its neighbours.

The leading Norwegian operators, Telenor and Telia, are positioned in the middle. Ice, who started its 5G rollout later than Telia and Telenor, is behind both on speed and availability. In general, Figure 48 is not suggesting that Norwegian 5G networks are providing better experiences than the other three countries – despite a higher CAPEX to revenue ratio.

Norway provides as fast download speed on its mobile networks as Denmark and faster than Finland and Sweden. The difference is today smaller than it used to be. Low mobile data usage and high CAPEX to revenue ratios contribute to the fast-speed position of Norway.

With regards to consistent quality, Norwegian operators rank at the global top, but so do operators from Denmark, Sweden, and Finland. Telenor stands out positively in Norway.

If comparing the pure 5G experience in the Nordics, Telenor Norway and Telia Norway have an average download speed and an average 5G availability while Ice is behind.

The mobile network experience in Norway is great but doesn't explain Norway's higher ARPU – as the experience is equally good in the other Nordic countries.

13 Summary and conclusion

In summary, the findings of this edition of the analysis are:

Market ARPU

- In all eight apple-to-apple comparison cases, Norway's ARPU is higher than Denmark's, Sweden's, and Finland's – before and after compensation for differences in purchasing power.

Total mobile service revenue per consumed GB

- The total mobile service revenue per consumed GB is, before and after compensation for differences in purchasing power, between 1.6 to 5.4 times higher in Norway than in the other Nordic countries.
- It's likely that the high revenue per GB hampers the Norwegian usage.

Mobile data usage vs. market ARPU (value for money)

- The Norwegian ARPU is always higher than the ARPU of the other three countries – regardless of including or excluding M2M and regardless of including or excluding FWA.
- The Norwegian data usage is always lower than in Finland and Denmark. The Norwegian data usage is lower than the Swedish in three out of four cases: When including FWA, but excluding M2M, the estimated Norwegian data usage is slightly higher than the Swedish.
- The combination of highest ARPU and low data usage means that Norwegian mobile customers get less value for money than mobile customers in Denmark, Sweden, and Finland.

Operator ARPU

- Telenor Norway has a uniquely high mobile ARPU.
- Telia Norway has much lower ARPU than Telenor Norway but still higher than other operators in the Nordics.

Pricing of mobile data plans

- Norwegian plans can't yet fully compete on price with Danish, Swedish and Finnish plans.
- If not considering the Norwegian policy to throttle unlimited plans after 100 GB, the gap to Finland and Sweden is not substantial, though – about 30-50 NOK per month.
- Danish mobile providers are offering the most affordable plans in the Nordics.

EBITDA

- Neither Telenor Norway nor Telia Norway has a problem with high OPEX. If so, their EBITDA margins wouldn't be best in class and improving.
- Lyse Tele has a lower EBITDA margin, close to the Nordic median if excluding Telenor Norway and Telia Norway.

CAPEX

- Norwegian operators all invest more – as share of total revenue – than the median Nordic operator.

Cash flow approximation (EBITDA-CAPEX)

- Neither Telenor Norway nor Telia Norway has a problem with high OPEX+CAPEX. If so, their EBITDA-CAPEX margins wouldn't be the highest in the Nordics.
- The situation for Lyse Tele is different: In 2023, Lyse Tele could not cover its CAPEX with its EBITDA.

Market concentration

- The Norwegian mobile market is uniquely concentrated.
- It is not just explained by the number of MNOs. Telenor's revenue market share explains 71% of Norway's HHI.
- Norway is slowly moving towards a lower concentration, though.

Mobile network experience (quality for money)

- Norway provides as fast download speed on its mobile networks as Denmark and faster than Finland and Sweden. The difference is today smaller than it used to be. Low mobile data usage and high CAPEX to revenue ratios contribute to the fast-speed position of Norway.
- With regards to consistent quality, Norwegian operators rank at the global top, but so do operators from Denmark, Sweden, and Finland. Telenor stands out positively in Norway.
- If comparing the pure 5G experience in the Nordics, Telenor Norway and Telia Norway have an average download speed and an average 5G availability while Ice is behind.
- The mobile network experience in Norway is great but doesn't explain Norway's higher ARPU – as the experience is equally good in the other Nordic countries.

This new edition of the analysis doesn't repeat the full root cause analysis of the original analysis issued in 2020 but re-establishes the key finding: Regardless of adjustment for purchasing power, the Norwegian mobile revenue per GB is higher than in Denmark, Sweden and Finland and the most likely root cause is the higher market concentration in Norway.